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ABSTRACT

The Job Skills Education Program (JSEP) is a computer-based, functional basic skills curriculum and instructional delivery system originally designed for the U.S. Department of the Army. The U.S. Department of Labor funded an exploration of the feasibility of increasing the use of JSEP as a workplace literacy tool for employers. It was found that JSEP can work in civilian environments under pilot or test site conditions; however, there were significant barriers to immediate and widespread application of JSEP in the civilian sector. The barriers included (1) incompatibility of JSEP computer systems with the most commonly used commercially available computer system; (2) high cost of work stations and other special equipment necessary to operate JSEP; (3) lack of resources to provide sufficient technical support for both courseware and software; (4) a requirement that the programs be customized to the needs-specific occupations and employers at cost to the user; (5) an unresolved issue of control of the copyright for JSEP courseware; and (6) continued use of many Army-specific examples in the JSEP graphics and exercises that may inhibit civilian use. Further, it was found that JSEP is not a stand alone system but needs to be implemented as part of an overall workplace basic skills training system involving literacy task analysis, onsite customization, and supplemental instruction. (Names and addresses of 15 resources and contacts are included. Appendix includes statements by Florida State University and Ford Aerospace about the use of JSEP.) (CML)

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Lessons Learned:

Job Skills Education Program

Final Report

Prepared By
the National Alliance of Business

for the
Employment and Training Administration
U.S. Department of Labor

U.S. DEPARTMENT OF EDUCATION
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Table of Contents

Acknowledgements 2

Executive Summary 3
- General Findings 4
- Summary of Specific Findings 5

Project Description 12

Job Skills Education Program Overview 14

Meridian Partnership Demonstration Site 17

White Plains JSEP Pilot Site Review 29

Civilian Use of JSEP on Military Bases 34

Interest in JSEP at Community Colleges with MicroTICCIT 39

Business Response to JSEP 44

Summary of JSEP Symposium 47

Corporate Workplace Literacy Profiles 53

Resources and Contacts 73

Appendix
- Florida State University Paper 76
- Ford Aerospace Paper 80

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Florida State University, Ford Aerospace, the Department of the Army, Meridian Community College, Peavey Electronics Corporation, the Mississippi Governor's Office on Literacy, White Plains Continuing Education Center, New York State Education Department, Northern Virginia Community College, St. Louis Community College, Gateway Community College, Brigham Young University, Burlington Northern, and the U.S. Departments of Labor and Education.

In addition, we would like to thank the participants in our business forums, and the personnel from the nineteen companies who provided us with information about their workplace literacy programs.

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EXECUTIVE SUMMARY

Background

The Job Skills Education Program is a computer based, functional basic skills curriculum and instructional delivery system originally designed for the U.S. Department of Army to prepare military personnel for training in specific Military Occupational Specialities (MOS). In 1982, the Army contracted with Florida State University and Ford Aerospace Corporation to develop the courseware for use on Ford Aerospace MicroTICCIT and PLATO computer delivery systems in providing basic skills instruction to soldiers. JSEP has since been installed and tested at a series of military bases around the country.

Since many of the military occupations have civilian counterparts, a federal interagency task force including representatives of the Defense Department, the U.S. Department of Education, the U.S. Department of Labor and others recommended that the technology developed under JSEP be modified for civilian use as a technology transfer program. Subsequently, the U.S. Department of Education funded Florida State University and Ford Aerospace Corporation to make the JSEP military occupational modules appropriate for use in training for civilian occupations, a process which became known as "de-greening" (from the Army green uniforms).

The National Alliance of Business Project

In June of 1988, the U.S. Department of Labor funded the National Alliance of Business to explore the feasibility of increasing the use of the Job Skills Education Program (JSEP) as a workplace literacy tool for employers. The original grant called for NAB to identify employers willing to demonstrate the uses of JSEP with their employees. Although a number of employers were identified, they encountered cost and technical barriers to their use of JSEP as it existed at that time. Three other grantees, representing the states of California, Indiana, and Delaware, encountered similar barriers.

The grant was subsequently modified so that NAB was charged with investigating the barriers to the transfer of JSEP to the civilian sector and investigating alternative institutional arrangements for delivery of JSEP training. The revised project involved activities in which NAB would:

- Provide technical assistance and evaluation services to a multi-funded JSEP demonstration involving Meridian (Mississippi) Community College working with Peavey Electronics Corporation to use JSEP to provide basic skills to Peavey employees;
- Review the implementation of JSEP instruction at a separately funded continuing education center site in White Plains, New York;
- Review existing JSEP demonstration projects funded by the U.S. Department of Labor in California, Indiana, and Delaware
- Investigate the potential for civilian use of JSEP at existing military facilities;

- Investigate the potential for transfer of JSEP to community colleges which already had access to the MicroTICCIT delivery system;

- Conduct a series of Business Forums in various cities to gather information from a cross section of private employers on their receptiveness to using JSEP in their firms;

- Research existing corporate sponsored workplace literacy programs to provide context and comparison with JSEP sites;

- Conduct a JSEP Symposium with key organizations at the conclusion of the project to review findings.

This report describes the activities and findings of the NAB project.

General Findings

While the research found JSEP can work in civilian environments under pilot or test site conditions, there remain a number of significant barriers to immediate and widespread application of JSEP in the civilian sector. These barriers include:

- Incompatibility of JSEP computer systems with the most commonly used commercially available computer systems.

- High cost of workstations and other special equipment necessary to operate JSEP (MicroTICCIT, the personal computer version of JSEP, costs $40,000 for the host computer and an additional $6,100 for each additional terminal).

- Lack of resources to provide sufficient technical support for both courseware and software.

- A requirement that the programs be customized to the needs specific occupations and employers at cost to the user.

- An unresolved issue of control of the copyright for JSEP courseware.

- A continued "greenness", i.e. use of many Army specific examples in the JSEP graphics and exercises, which may inhibit civilian use.

The researchers also found that JSEP is not a stand alone system but needs to be implemented as part of an overall workplace basic skills training system involving literacy task analysis, on-site customization, and supplemental instruction.

In summary, the National Alliance of Business believes that JSEP will only be valuable to the civilian sector when it has been developed into a commercially marketable product at a competitive price. While most end users are satisfied with the operation of JSEP, widespread civilian use will be unlikely unless the system: a) can be further modified to be commercially competitive in terms of costs; b) is made available for use on commonly available computer systems; and c) consistent, ongoing technical support is assured.

Specific Findings from Project Components

Meridian Multi-Funded JSEP Demonstration Site. As a part of the overall NAB JSEP project, NAB served as one of the sponsors for a multi-funded JSEP development and demonstration project in Meridian, Mississippi involving Meridian Community College, the Peavey Electronics Corporations, and the State of Mississippi. A separate evaluation of this demonstration was conducted under contract with NAB. The evaluator found that:

- The JSEP courseware has the potential to meet the needs of single employers in the private sector. Its effectiveness is evidenced in learner progress, in positive changes in performance on the job, and in both the evaluative and attitudinal statements and behaviors of participating learners, instructor, managers, administrators and supervisors.

- The processes of identifying critical tasks with the employer, conducting literacy task analyses, and developing and administering needs assessment instruments are key steps in successful program development for employer-specific training applications. It is possible to customize JSEP to meet the needs of single employers. However, the results may be contingent on the level of expertise of the personnel implementing this procedure.

- Successful multi-agency implementation of JSEP require that community partnerships be established among partners who share common goals and who have high levels of commitment. In the Meridian project, the project partners had already identified representatives with decision making authority, established regular communication, and had a knowledge of each other and a history of working collaboratively together. They had also identified common goals and thus were committed to the success of the project. Additionally, the partners had ties with the Governor's Office, which was actively interested in promoting the project.

- Before the partners in Mississippi can consider the future of JSEP, they need to know the status of JSEP in regards to its being public domain material. If JSEP is under copyright to the suppliers, it is unlikely that the partnership will continue to use it for employee instruction beyond the version now in use for Peavey employees. It is likely that they will look for alternate instruction. If, however, JSEP is available in the public domain, it is likely that Meridian Community College will purchase additional student workstations to increase their capacity for service to Peavey and to other members of the local business community. In personal interviews, the partners expressed interest in expanding JSEP through development of new lessons that better fit the current needs of changing positions and tasks in industry.

White Plains JSEP Demonstration Site. Overall, the staff, director and students are satisfied with the content of JSEP, although they emphasize that it must be used in conjunction with other instruction. For example, most at-risk students require some instruction in learning how to learn and building self esteem that can best be taught in a classroom setting. In addition, classroom instruction is needed to teach listening, speaking and vocabulary skills.

In summary, the White Plains staff think that the content and style of JSEP itself warrant expanded civilian use. However, before it could be successful, the potential barriers discussed here -- degreening, customization, technical problems, and cost -- must be resolved. In terms of expansion for further civilian use:

- Further "degreening" would be necessary. Staff believes some users will object to the military terminology, examples and illustrations and that further degreening would also be necessary before private sector businesses could use JSEP.

- Customization would be essential. Florida State University performed all the customization for White Plains (designing lesson plans for the 20 occupations selected by White Plains, and substituting civilian examples for deleted military examples where necessary). However some potential civilian users may wish to do their own customization and authoring. Under their pilot agreement with Florida State, after the set of occupations and customization was agreed upon, White Plains staff were not authorized to do additional customization during this test period. An examination of the possibility for more flexible agreements might be required in order to allow other civilian organizations to use JSEP.

- The large number of technical problems with JSEP present a barrier to widespread use. While White Plains staff report that both Ford Aerospace and FSU have been attentive in helping resolve these problems, the time that the White Plains instructor spent on them prevented the JSEP facilities from being open for more than 4.5 hours per day throughout the demonstration. Ford Aerospace and FSU are working to resolve these problems: Revision 1.0 to the JSEP courseware incorporated the first set of corrections into the materials and was released to both sites in September 1989. Revision 2.0, which incorporates further corrections, is expected to be released in March 1990.

- Cost is another potential barrier to expanded civilian use according to White Plains officials. Although cost must be evaluated in terms of both expected gains in future productivity and of the breadth of knowledge covered and number of students served by one instructor, it should be noted that White Plains was only in a position to field test JSEP because the state bought the MicroTICCIT compatible hardware. MicroTICCIT costs $40,000 for the host computer, plus $6,100 additional per work station. Not only is MicroTICCIT expensive, but maintenance costs are high and it does not normally have word processing capabilities, although word processing systems can be used on the JSEP host when the MicroTICCIT application is brought down and the system is brought up into other DOS applications such as word processing. Only MicroTICCIT courseware may be used on the MicroTICCIT compatible hardware and some believe that the technology is becoming outdated. Other basic skills providers might prefer purchasing the new video disk software which have the same color and graphics capabilities of MicroTICCIT, but are compatible with personal computers.

Other DOL-Funded Demonstration Sites Three states received grants from the U.S. Department of Labor to determine JSEP's applicability for non-military adults: California, Indiana, and Delaware. These three demonstrations were abandoned early on, primarily because of the high costs of hardware necessary to operate JSEP and the absence of start-up funds to support these costs. In addition, staff in Indiana cited legal difficulties in using certain public funds to support JSEP. Thus, the cost problems other sites encountered proved to be an insurmountable barrier to JSEP's use in these three demonstration sites. It seems that the coordination of funds that made possible single site demonstrations at Meridian and White Plains was not feasible on a statewide basis.

Military Bases as Training Sites for Civilian Training. In a review of the potential civilian use of JSEP at five military bases, NAB staff found that:

- Staff at all bases believe that JSEP can be an effective means of teaching certain basic skills, and that
- *The prospects for civilian use of JSEP on military bases do not look good* primarily because of lack of available space. (JSEP workstations are usually in use for long hours five or six days a week).

Community College Use of JSEP. NAB staff interviewed officials at several community colleges which currently have MicroTICCIT and/or PLATO systems but do not use JSEP to determine their potential interest in using JSEP. Staff found:

- Although four of the five organizations interviewed are happy with TICCIT/MicroTICCIT and three respondents expressed interest in learning more about JSEPand possibly participating in further field testing, implementation could only become a reality at those institutions which already have either a MicroTICCIT or PLATO system primarily because the cost of buying either MicroTICCIT or PLATO in order to acquire JSEP would be prohibitive.
- Respondents indicated that because PLATO and MicroTICCIT are becoming outdated, and their previously unique graphic and interactive capabilities are now available on software compatible with personal computers, it is unlikely that colleges or firms will be purchasing these systems for their other needs.

Business Forums. NAB staff conducted a series of forums with business leaders in various cities to determine potential interest in use of JSEP as well as business opinions as to possible barriers to implementation. Although the participants were receptive to the JSEP program, a few concerns remained. The participants generally agreed that the JSEP program was effective and interesting and would be successful with the following vital changes:

- The cost of purchasing JSEP through Ford Aerospace needed to be reduced if it were going to be marketed in the private sector.
- The JSEP software needed to be be adapted to more widely used mainframe systems that are common in the business community.
- The military terms and graphics needed to be removed for JSEP to be acceptable in a business environment.

Other Corporate Sponsored Workplace Literacy Sponsors. NAB staff gathered information from 19 non-JSEP, corporate-sponsored workplace literacy programs which had received recognition in the literature on workplace literacy. Staff found that:

- Generally, computerized instruction is not used by the programs surveyed, and when it is, it tends to be for extra practice and reinforcement rather than for regular instruction. Only one company used the computer for regular instruction. It uses basic skills software on the PLATO system and is investigating IBM info window technology and video disks.

- Five of the nineteen programs make some use of computer software for reinforcement. Several companies expressed interest in obtaining computerized basic skills programs, and a few have already made plans to do so.

- The primary deterrent to using computerized software seems to be the expense. This was mentioned as a deterrent by three firms. Others mentioned the difficulty to arrange for time on computer terminals that are already in house. One administrator noted that human interaction is needed -- especially at the lower levels.

In addition to discussing the characteristics of their literacy/basic skills programs, NAB asked program administrators what recommendations they had for other companies wishing to start a program. Some of their suggestions are:

- "Curriculum must be designed to meet the needs of supervisors as well as employees." (Gloria Asher, Erol's)

- "Program must be offered as a positive opportunity -- not as a solution to an individual's problems." (Janet Brinkley, Planters LifeSavers Co.)

- "Insure that managers and supervisors are supportive from the start -- and that they will allow students to attend." (Janet Brinkley, Planters LifeSavers Co.)

- "CEO must endorse. Otherwise it won't work." (Edward Brayboy, Newport News Shipbuilding)

- "Teachers must be handpicked -- and have experience with and be able to establish a rapport with low level *adults* " (Edward Brayboy, Newport News Shipbuilding)

- "It is important that an educator (not a trainer) is on the payroll, or is hired as a consultant." (Chuck Fessenden, Swift Textiles)

- "Talk to others who have done it. Do a needs assessment first. Use functional context as much as possible -- it is very important, and the classes that incorporate the most job related examples are the best classes." (Linda Lindsey, Onan Corporation)

JSEP Symposium NAB organized a symposium of JSEP developers, users and government funding agencies to discuss what the next steps should be in the process toward further development, demonstration and dissemination of JSEP. This symposium was held November 30-December 1, 1989 and was attended by representatives of the Department of the Army (DOA), the Department of Labor (DOL), the Department of Education (DOE), Florida State University (FSU), Ford Aerospace, New York State Education Department, Meridian Community College, Peavey Electronics Corporation, the Mississippi Governor's Office on Literacy, and the National Alliance of Business.

Many issues, primarily related to the further development and refinement of JSEP for use by various civilian populations, were discussed. The aim of the meeting was to bring all parties together to openly discuss these issues, and to provide NAB with reaction to findings reached over the course of the project. It was not expected that there would be consensus on every issue, although in fact there was *general* agreement on a number of issues.

- **Utility of JSEP.** There was general agreement that JSEP is currently one of the best computer-based systems available for the instruction of basic skills in the general context of certain specified occupations. It is particularly strong in teaching problem solving and math skills. Although the JSEP curriculum has a verbal component, for vocabulary, reading, and to an even greater extent, speaking, listening and writing skills, it was generally agreed that JSEP must be supplemented by classroom instruction.

- **Degreening.** There was general, but not complete, agreement among Symposium participants, that *further degreening* should be done before JSEP could be marketed to the private business sector. There was less agreement about the extent of additional degreening required for expanded use by public sector programs (adult education, JTPA etc.).

- **Customization.** Customized lesson prescriptions were created for both the Meridian and White Plains demonstrations. Customizing prescriptions is a fairly simple job, given proper training of program staff, and does not involve changing the JSEP lessons. It is most easily done by conducting a survey of the prerequisite skills required for a particular occupation, selecting lessons from JSEP that provide instruction for those skills, and then entering the lesson list into the Student Management System (SMS). This kind of customization can and probably will be done at most industrial sites in order to develop the occupational paths that best fit local job training needs. Costs for other changes would be in direct proportion to the number of changes that were done to both text and graphics in the individual lessons.

- **Authoring.** Both Florida State and Ford Aerospace representatives felt that allowing customers of JSEP to change the content of lessons though eliminating/adding/changing examples would in essence dilute JSEP, that it might no longer get the same results, and would no longer be a comprehensive integrated product. In addition, customer effected changes to the curriculum or SMS have the potential to complicate or jeopardize the upgrade path for that user since new releases depend upon structure that the user may have altered. Ford and Florida State felt that this lack of quality control would be seriously detrimental to the integrity of JSEP unless each changed or newly developed

lesson underwent the same rigorous review and evaluation cycles as the original materials. Although many Symposium participants shared some of Florida State and Ford Aerospace's concerns on this issue, there was not unanimous agreement that multiple versions of JSEP would be untenable.

- **Copyright Issue.** Although many government contracts and grants allow private sector grantees to apply for and receive private copyrights for products developed with government funds, the copyright for JSEP courseware is currently being questioned by a number of organizations, and has yet to be resolved. Because Symposium participants were not in a position to affect the resolution of this issue, they agreed to limit discussion about the pros and cons of public versus private domain.

- **Maintenance, Startup Problems and Technical Assistance.** Both White Plains and Meridian encountered more problems than they had anticipated, partly because new hardware caused software problems. It was noted that Florida State was not paid for the technical assistance which they provided to Meridian, and the group agreed that in any future demonstrations or marketing of JSEP, funds must be budgeted for technical assistance. In addition, a single point of contact (e.g. an 800 telephone number answered beyond regular business hours) would be essential.

- **Work Station Costs of JSEP.** One of the concerns of some Symposium participants was the work station costs of JSEP ($6,100 for each). Although one participant asserted that the future benefits to firms in terms of increased productivity and promotability of employees far outweigh the costs, there seemed to be some agreement that lower costs of installing, operating and maintaining JSEP work stations would, if not be a precondition for, then greatly facilitate the dissemination of JSEP. Several ongoing developments that are being worked on by Ford Aerospace have the potential to somewhat lower the cost per work station.

- **Private Sector Distribution of JSEP.** Florida State representatives reported they have had preliminary discussions with a number of companies interested in marketing JSEP. One important criterion for selecting a vendor will be the extent to which they have addressed promotion and sales of the system. Ford Aerospace has also had strong indications of interest in JSEP. Although JSEP has had no advertising and little publicity, Ford has received over 200 inquiries about it.

- **Future Development of JSEP.** Florida State representatives recommended a number of specific technical and subject matter improvements be made to JSEP including:

  1. Fix errors based on current situation at Meridian and White Plains.
  2. Obtain other industrial input on errors based on proposed Ford Demonstration.
  3. Add more on civilian survival skills (balancing check book etc.)

4. Consider adding more teaching of computer literacy -- some have recommended drill and practice in keyboarding and adding word processors to better teach writing skills.

5. Expanding sections on "learning how to learn."

- **Public versus Private Sector Funding for JSEP.** There seemed to be agreement within the group that at least for the next year or two some continued federal government funding of JSEP would be necessary. There was also agreement that in the long term, for JSEP to be broadly distributed successfully, private investment would be important. However, this discussion was somewhat limited by the fact that the copyright of JSEP courseware is currently unresolved. Nevertheless, some felt that public dollars should continue to be used to support JSEP regardless of how the copyright issue is resolved, because a large amount of public dollars are already allocated for basic skills programs (including Adult Education, JTPA, JOBS etc.) and JSEP could benefit these program participants.

- **Possible Sources of Funds for JSEP.** Several participants felt that coalitions should be organized to obtain public funds to provide links to both state, federal and private sector sources). Within the federal government, approaching several departments jointly might be the next logical step. Three or four Symposium participants (both at the federal and state government level) thought the potential of using JOBS program funds to pay for JSEP for welfare recipients should be explored. One advantage of such an arrangement would be that JSEP facilities at the local level could serve clients funded by several different federal programs (JTPA, JOBS, Adult Education, Job Corps etc.). There was general agreement that at this stage JSEP needs a "champion" to insure that funds are found to refine it so that it is more marketable; develop a marketing plan and a delivery system, and support technical assistance to users.

PROJECT DESCRIPTION

The National Alliance of Business (NAB) was awarded a grant by the U.S. Department of Labor in June of 1988 to explore the feasibility of increasing the use of the Job Skills Education Program (JSEP) in non-military environments. The project sought to answer the question "How Can JSEP Work?" This report attempts to answer that question.

The Job Skills Education Program is a computer based, functional basic skills curriculum and instructional delivery system that was originally designed for the U.S. Department of Army to prepare military personnel for training in specific Military Occupational Specialities (MOS). A more detailed description can be found in the JSEP Overview section of this report.

NAB's main objectives were: to explore strategies to increase the accessibility of JSEP for the business, employment and training, and education communities; to provide technical assistance to a state initiated demonstration project in the private sector; and to review existing JSEP demonstration projects to assess the applicability for non-military adults.

The following outlines the approach and some of the project activities conducted to accomplish those objectives.

1. Explore strategies to increase the accessibility of JSEP for the business, employment and training, and education communities. The "How Can JSEP Work" project identified: the essential elements for successful transfer, the barriers, the strategies to minimize the barriers such as cost considerations; the capacity for expansion; and revisions to enhance the quality and currency. The strategies explored include:

- utilize existing community college sites that have MicroTICCIT ;
- utilize existing JSEP military sites for training quasi- and non-military personnel;
- creation of multi-funded training sites using JTPA, Carl Perkins, state, and/or business funds for the business, government, and JTPA populations; and
- explore business receptivity to JSEP through business forums and interviews with business operators of workplace literacy programs.

NAB project staff worked in cooperation with community college, military, business and state/local employment and training professionals, to explore and document the feasibility of these approaches to assess the accessibility of JSEP to the civilian sector.

2. Provide technical assistance to a state-initiated demonstration project to further assess the accessibility and adaptability of JSEP to the private sector.

The state of Mississippi created a JSEP training site for Peavey Electronics in cooperation with the Governor's Office, and Meridian Community College. This project was jointly funded by the Governor's Office, Meridian Community College, and a significant capital investment by Peavey. This provided an opportunity to see how the JSEP program works in the private sector and the technical requirements and costs associated with a start-up site.

NAB provided funds to help offset the costs of a curriculum consultant who developed learning prescriptions which were inserted into the Student Management System to meet the needs of the non-military adults. As with Activity 1, project staff identified the essential elements for successful transfer, the barriers, the strategies to minimize the barriers such as the cost considerations, the applicability for JTPA, the capacity for expansion, and revisions to enhance the quality and currency.

3. Review existing demonstration projects to assess the applicability for non-military adults.

NAB project staff visited the White Plains, N.Y. pilot test site to identify the successful elements of this project and the funding design. NAB project staff made a preliminary assessment as to the applicability of the JSEP Program for non-military adults. NAB staff were unable to undertake the assessment of the demonstration programs in California, Delaware, and Indiana, as these sites withdrew from the JSEP demonstration.

In November 1989, NAB organized a JSEP Symposium to validate the information and experience of the "How Can JSEP Work" project and to develop recommendations for future expansion plans.

This report documents these project activities and provides the most up-to-date information on the future potential of JSEP. The many components of this project and the various contributors to this report create areas of redundancy . It is important to note, however, the significant similarities of the conclusions drawn from the various components.

JOBS SKILLS EDUCATION PROGRAM OVERVIEW

The following section is based on information provided by Dr. Robert K. Branson of Florida State University (FSU) and Dr. Lois Wilson of Ford Aerospace (Ford) respectively.. Working in cooperation with the Department of Army, FSU has the primary responsibility for courseware development and Ford has the primary resopnsibility for the hardware and software. The full text of the FSU and Ford Aerospace submittals to NAB including their recommendations for future improvements in the program are provided as appendices to this report.

The Job Skills Education Program (JSEP) is a computer-based, functional basic skills, curriculum that could be used prior to technical or on-the-job training in industry, vocational education, JTPA programs, and other settings, where trainees lack the basic academic skills to profit from training. The JSEP has gone through extensive developmental testing in industrial and job training programs.

The Civilian JSEP System

At present, the civilian version of the JSEP includes the following components:

1) 167 lesson titles. 142 are computer-based. Most titles are represented by two lessons, a Diagnostic Review Lesson (DRL) and a more comprehensive Skill Development Lesson (SDL). Each lesson has an appropriate post test.

2) Five Learner Strategy (LS) modules. In contrast to DRLs and SDLs, that address specific academic competencies, the LS modules are designed to teach students to be better learners.

3) The Student Management System (SMS), which manages student access to--and progress through--lessons and tests, collects and stores student demographic and performance data, and prepares reports for the JSEP Instructor.

4) The JSEP Common Test, currently a 65-item criterion referenced instrument that addresses 47 skills from the curriculum. This test is a greatly shortened and degreened version of an earlier instrument developed for use with soldiers in JSEP. This test is being used for the first time in the White Plains pilot test.

5) Supplemental instruments for assessing student attitudes regarding JSEP and the computer experience, as well as student reactions to particular lessons. These instruments were devised for use during the pilot test and must be revised for regular JSEP users.

6) JSEP Implementation Handbook. This document is the backbone of the JSEP Dissemination Plan. It has been bound separately and is designed to be used as a training and reference text by JSEP instructors. Extensive appendices provide instructors with helpful information and useful instruments.

The Florida State University contract with the U. S. Department of Education sought to answer two basic questions:

1) Does the JSEP, developed for use by soldiers, work with civilian students?;

2) What is the minimum amount of degreening (removing the Army context) necessary to make it effective with civilians?

FSU proposed to degreen only a portion of the original Army curriculum enroute to determining the answers to these questions. By careful rescheduling and internal rebudgeting, and a no-cost extension to the contract, FSU found that it was able to address the entire curriculum with different levels of degreening. FSU devised degreening guidelines for adapting the original military lessons, based upon the systematic application of instructional design principles and our experience with JSEP. In brief, the guidelines are as follow:

1) Remove or adapt military context references when they have no civilian equivalents;

2) Convert all military spellings to civilian ones;

3) Remove acronyms where possible;

4) Convert military ranks and titles to generic, civilian terms;

5) Replace military jargon with more familiar expressions;

6) Change graphics and illustrations when they might confuse civilian students or when changes in text require corresponding changes in graphics; and

7) Where possible, lower the readability level of text with shorter sentences, familiar vocabulary, and by changing multi-syllable words to simpler forms.

In applying these guidelines during the degreening and adaptation process, FSU found it necessary to delete 25 lesson titles that involved military skills for which there was no civilian equivalent. In a similar manner, FSU staff has become aware of gaps in the curriculum where additional lesson titles would be appropriate; but as such curriculum expansion is well beyond the scope of the current contract, it will have to be addressed in some future effort.

The JSEP instructors from Meridian and White Plains have made FSU staff aware of desirable modifications to the Student Management System (SMS), that we also believe should be addressed in some near future activity. When the additional data are available, revisions will be made based on these developmental trails. According to Ford Aerospace, "those modifications to the SMS that were deemed suitable were made and distributed" in subsequent revisions. Upon completion of revisions, JSEP will be ready for implementation in numerous settings based on market analyses.

Current Equipment Requirements To Operate Civilian JSEP

About ninety percent of the lessons for the civilian version of the Job Skills Education Program (JSEP) are computer-based, and all of the Student Management System (SMS) is computer-controlled. Therefore, JSEP requires computer equipment and the appropriate software to deliver the instructional program to the students. This will continue to be true no matter what product developments occur in hardware, software, and courseware.

The civilian version of JSEP was written using the ADAPT authoring language, a proprietary software product of Ford Aerospace Corporation. The ADAPT program operates using MicroTICCIT software, which in its current and future versions will run on many DOS-based machines.

When the JSEP demonstrations described in this report were undertaken, certain hardware items required to run the program were proprietary products of Ford Aerospace Corporation and could be purchased only through Ford Aerospace. Most critical among these proprietary hardware items was the display board, called the 860A board.

Three new software products have been or are currently being developed by Ford Aerospace. The first eliminates the need for all Ford Aerospace proprietary hardware from the MicroTICCIT System. The second permits standard computers to run as student workstations when connected to a host. The third permits MicroTICCIT to be released as a software product to deliver courseware on various hosts or file servers.

MERIDIAN PARTNERSHIP DEMONSTRATION SITE

This section is a summary of the full evaluation report of the Meridian project prepared by Jorie W. Phillipi for NAB in connection with its grant from the U.S. Department of Labor.

Background

The Technology Transfer Partnership Project in Meridian, Mississippi was developed collaboratively through the efforts and support of the U. S. Department of Labor, the National Alliance of Business, the Mississippi Governor's Office for Literacy, Peavey Electronics Corporation, and Meridian Community College. It is a study of the process for building and maintaining a partnership between a private industry and an institution of higher education for the purpose of providing a viable computer-based workplace literacy program for the labor force.

Workplace literacy, as it is defined in this context, is not a program for adults who cannot read. Rather, it is an opportunity for average readers ("intermediate literates") to receive training in those basic skills applications they use to perform their job tasks. Those workers who successfully complete the program are then better prepared to be considered for promotion and retention as imminent technological advances continue to accelerate job skill requirements.

The partners in the project were Meridian Community College and Peavey Electronics Corporation in Meridian, Mississippi. Peavey Electronics Corporation is a privately-owned manufacturer of electronic musical instruments, amplifiers, speakers, soundboards, and mixers. It is a growing, internationally competitive firm, employing approximately 1,400 workers in plants located in Meridian, and another 500 workers in plants in Decatur and Morton, Mississippi.

Meridian Community College houses the JSEP lab and is located on Highway 19 North on the outskirts of Meridian, about 20 minutes from the Peavey plants. The student body numbers approximately 3,100; and the college employs a full-time professional staff of 172 members. Meridian Community College has been providing Adult Basic Education non-credit developmental and literacy-related programs to the community for over 25 years. As part of an ongoing relationship with Peavey Electronics Corporation, Meridian Community College provides computer and technical training courses for Peavey employees, as well as pre-employment training for Peavey entry-level positions.

Initial contact between the partners was arranged through the agency of the Mississippi Governor's Office for Literacy in the fall of 1988. The Job Skills Education Program (JSEP), a computer-delivered instructional program originally developed for the U.S. military, was observed by the Governor's wife, Mrs. Julie Mabus, who considered its potential for use with state-wide workforce literacy efforts. Recognizing the need to address employee education in the technology-driven industry operated by Peavey, one of Mississippi's largest employers, and building on the on-going relationship between Peavey and Meridian Community College, Mrs. Mabus worked through the Office for Literacy to fund the project and to propose a private-sector JSEP demonstration partnership to CEOs/owners Hartley and Melia Peavey and Meridian Community College President William Scaggs.

Mrs. Mabus and Karl Haigler, Special Advisor to the Governor, aware of JSEP's potential, informed the National Alliance of Business of their interest in working collaboratively with NAB on the JSEP grant. Mrs. Mabus had already targeted Peavey Electronics as a potential site for testing JSEP's feasibility and success rate in the private sector. Because of NAB's close association with both individuals and their desire to test JSEP's transferability to the private sector, NAB decided to make the State of Mississippi the primary site for demonstrating JSEP in manufacturing. Mr. Haigler took the lead in organizing the various partners for the first strategic planning meeting of the Meridian Partnership.

Following the initial planning meeting of key personnel in January 1989, project implementation activities included:

- purchase and installation of hardware;
- identification of critical job positions by the employer;
- performance of literacy task analyses on critical job tasks;
- review and selection of JSEP lessons for each critical job task;
- staff training in use of hardware and courseware;
- needs assessment and recruitment of employee participants; and
- computer-based JSEP instruction for 64 employees for 40 hours.

Additionally, planning meetings were held and data were collected to facilitate evaluation of results.

Purpose of the Evaluation

The underlying purpose of a technology transfer demonstration project is to determine the applicability of instructional technology programs developed with federal funds, to private sector needs. Changing demographics and the constant upgrading of technology within manufacturing have created an urgent need to ward off the imminent danger of a national workforce shortfall. Growing numbers of employers are recognizing the need to provide basic skills and education for their workers as an ongoing part of human resource development -- a benefit to facilitate the joint survival of both the employer and the employees.

The primary purpose of this project was to determine the feasibility of using the computer-based Job Skills Education Program (JSEP), developed for the U.S. Army and adapted for use with limited civilian occupations, for a wide range of private sector employee education needs by customizing the program content based on the results of literacy task analyses. Specifically, the evaluation objectives to be investigated were:

- the program's capacity to provide computer-based instruction in those basic skills applications necessary for competent performance of the critical job tasks identified by the employer;
- the feasibility of replicating the requisite JSEP customizing process to meet the workplace literacy needs of other private sector employers;
- evidence of user-friendliness of JSEP courseware and hardware, and the lab environment;

- evidence that all program participants (i.e., learners, educators, industry managers and supervisors) share an understanding of program goals;
- evidence of adequate training and technical support by producers for use of hardware and courseware; and
- the likelihood that the process for establishing and maintaining an industry-education partnership for the purpose of providing a JSEP workplace literacy program is a replicable model.

Description of the Program to be Evaluated

JSEP is a computer-based basic skills program that includes over 300 hours of instruction on approximately 200 competencies. Originally developed for the U.S. Army as a result of job task analyses conducted in 1980-82 on 94 military occupations, the materials provide prescribed lessons containing multiple-choice items in three content areas: verbal lessons that present reading and writing skills, quantitative lessons that present mathematics skills, and learner strategy lessons that present advice for time management, motivation, and so on. Practice time is incorporated into the presentation of materials within each lesson and consists of presentation of information on a series of screens followed by learner responses to multiple-choice and short answer questions.

The topics covered are not job-specific, but are related to the underlying basic skill competencies that were identified as necessary for use in performing the aforementioned military occupational tasks. In the civilian version, lesson series have been regrouped and suggested for use with 20 civilian vocations that roughly correlate to the military occupations.

Materials are designed to be used independently by the learner and can be individualized according to lessons needed by developing a customized learner prescription. There is, however, only one instructional ability level of content presentation for any one topic, which offers the learner either an abbreviated review version or a lengthy demonstration/practice version of the materials within each lesson.

Feedback is in the form of pre- and post-lesson test scores. JSEP also includes a management system that stores and prints out student records.

For the purpose of the technology transfer partnership project, the lessons contained in JSEP were analyzed, then matched with the basic skills applications identified by literacy task analyses conducted on the critical job tasks identified by the employer. Lessons from both the military and civilian versions of JSEP were combined in the ensuing learner prescriptions. The result was four customized JSEP lesson prescriptions, one for each of the critical job positions at Peavey Electronics. These include line operators and subassemblers, woodworking and cabinetry preparers and assemblers, technicians and quality assurance inspectors, and CNC machinery operators.

Because JSEP is an instructional program most appropriate for use by intermediate literates, (i.e., 5th to 9th grade reading levels), it was decided that potential participants from each of the employer-identified critical job areas should be screened

to select eligibles, based on prerequisite reading level performance. This needs assessment took the form of a 5.2-8.6 estimated reading grade level Cloze test which was developed from workplace "job-generic" materials in the Peavey Employee Handbook. It was administered on a volunteer basis to 242 Peavey line operators and assemblers, woodworkers, cabinetmakers, CNC machinery operators, recycling technicians and inspector testers.

Of the employees tested, 62% were eligible for JSEP training, 20% were performing at a reading level indicating a less than urgent need for JSEP training, and 18% were performing at a reading level too low to be successful with JSEP. Those who performed within a 5.2-8.6 RGL were notified of their eligibility to participate in this first demonstration phase of the workplace literacy program. Peavey then selected a pilot group of 64 from those eligibles desiring to participate, based on seniority, job attitude, and attendance.

Classes were held on company time and scheduled to accommodate plant operating hours. Participants attended for 1 hour and 40 minutes twice a week for twelve weeks. Four classes were held each day, Monday through Thursday, beginning at 7:00 am. and ending at 2:40 pm. Van transportation was provided by the college to and from the plants and the JSEP lab at Meridian Community College. Eight participants per class were assigned to specific class times, after careful planning with line supervisors, to minimize the impact on production.

Classes were instructed by a recently trained JSEP operator/systems manager, who has extensive experience in teaching adult remedial education classes at the college and in using computer-assisted learning. To build capacity for meeting employer needs in the community beyond the demonstration, the instructor also participated in conducting the literacy task analyses, developing the JSEP customized lesson prescriptions, and developing and administering the needs assessment instrument in the plants. Approximately 6 weeks into the demonstration, an assistant instructor was added to the program by the community college.

Evaluation Design

The evaluation of the JSEP Program Technology Transfer Partnership Project in Meridian, Mississippi employed a modified version of the C.I.P.P. model.

Briefly the C.I.P.P. evaluation model examines: Context (i.e., shared goals and philosophy of participants); Input (i.e., resources, including personnel, training, materials, support, and facilities); Process (i.e., congruence of observed development procedures and instruction with program goals and research on instructional effectiveness); and Product (i.e., indicators of program effectiveness and replicability).

This method of evaluation was chosen by the evaluator as the most suitable tool for investigating the evaluation objectives, because it examines program effectiveness through structured analysis of the cohesiveness of program goals, components, and operations, independent from comparisons to outside standards or other programs.

Evaluation Instruments

Data for this evaluation were gathered using needs assessment tests, pre- and post-program learner surveys, job supervisor performance ratings and surveys, interviews with learners and program personnel, documented literacy task analyses of employee job duties, and JSEP program records. Additionally, data were gathered from detailed analyses by the evaluator of program documentation, instructional materials, instructor's log and correspondence with the hardware and software suppliers.

Procedure

Following an initial meeting with key personnel at the Mississippi Governor's Office for Literacy in Jackson, MS, to establish evaluation objectives and program goals, the activities of the evaluator included:

1. **Initial contact with program personnel.** Meeting with collaborating partners from Meridian Community College, Peavey Electronics, the Mississippi Governor's Office for Literacy, and the National Alliance of Business to obtain an overview of the history, development, process, and goals of the JSEP Program Technology Transfer Partnership Project.

2. **On-site observations and interviews.** Meeting with Peavey personnel to identify critical job positions and tasks that would be affected by technology upgrades for inclusion in the demonstration. Documenting job task analyses and literacy task analyses following worker observations and interviews in plants, conducted by evaluator to verify basic skills applications required for competent job performance. Administrating an employee Needs Assessment at four Peavey plants. Interviews with line supervisors were also conducted. Subsequently meeting with Peavey Training director to ascertain selection of participants and to collect preprogram employee performance ratings. Administration of pre and post-program learner survey instruments and classroom observation.

3. **Off-site analyses of materials.** Visit to FSU to work through selected JSEP courseware lessons for the purpose of matching instructional content to needs of Peavey participants, based on the documented literacy task analyses of employer-identified critical job tasks.

Participation in hardware MicroTICCIT Systems Operator training at Ford Aerospace with Meridian Community College staff.

4. **Communications and Operations.** Six multiple-meeting on-site visits to discuss scheduling and progress in the evaluation activities, preliminary findings, and to review evaluation data forms prior to use. Regular telephone contact with NAB, Governor's Office for Literacy,JSEP lab instructor and administrators at Meridian Community College, and Peavey management. Interim progress and draft evaluation reports submitted to National Alliance of Business for dissemination to key project personnel.

Limitations of the Evaluation

This evaluation is based on individual and group interviews, observations of instruction and training, evaluation of process documentation and instructional materials available during the spring and summer of 1989. Direct observations of instruction at Meridian were limited to two days of classes of a single instructor.

By agreement, the major resources of the evaluation were to focus on the process of partnerships and the impact of JSEP on job performance, rather than on pre- and post-test gains of learners. Also the project was evaluated through comparison of program results with what is known about effective instruction, and also with the project's stated goals and priorities.

To a much lesser extent, the program was to be evaluated in terms of how well students were able to demonstrate mastery of course material. In any case, generalizations from the data from 64 learners and one instructor from one partnership site must be qualified. These generalizations are indications of effectiveness only. Examination of additional learner-employees at additional private sector sites is required before solid statements can be made about program effectiveness and replicability.

Participant Characteristics

The participants in the pilot demonstration were 64 industrial workers employed by Peavey Electronics Corporation in Meridian, Mississippi plants. The firm employs 1900 workers to manufacture electronic musical instruments, amplifiers, speakers, soundboards, and mixers. The average worker is 34.5 years old and the employee population is approximately 32% Black, 64% Caucasian, and 4% Indian or Asian.

Participants were selected based on demonstrated ability to comprehend materials written at a 5th to 8th grade estimated reading grade level, seniority, attitude toward work, attendance, and availability during scheduled class times. The composite profile of the average learner was a black male, 35.8 years old, with a high school diploma, who had worked at the plant for 7.5 years, and had been employed in his/her present position for 4 years. Thirty-eight percent of the participants were employed as assembly workers, thirty-eight percent as quality assurance technicians, and twenty-four percent as machine operators.

Because of the nature of the evaluation design, the focus of evaluation activities extended beyond the traditionally-held concept of "participants" to also include data from program administrators, business managers and line supervisors.

Results of the Process Evaluation

This section of the evaluation addressed the validity of the development and instructional process employed by the program in relation to program goals and research documenting instructional effectiveness. Information gathered from program development process documentation, correspondence, instructor's log, classroom observations, and interviews with key program personnel follows. It was analyzed for evidence of process validity and for potentially detrimental or enhancing partnership relationship factors.

The overall procedure for tying JSEP program content to learners' job needs and job background schema was well designed and implemented. Using literacy task

analyses to identify the basic skills applications that a competent worker uses on the job and matching these with the contents of the instructional program allows for transfer of contextual learning to job performance and for skill retention because the newly acquired information can be put into practice on a daily basis.

Classes observed by the evaluator gave evidence of learners who were engaged in instruction, well-matched in ability with the level of the instructional materials, and progressing at an anticipated rate. Additionally the JSEP instructor has been trained to provide additional paper-pencil functional context workplace basic skills curricula to enhance existing JSEP lessons and to customize JSEP prescriptions for other industries or other critical job tasks identified at Peavey.

The commitment of the partners to the collaborative efforts of the project were evidenced in their willingness to communicate, solve problems, and support the project throughout the demonstration period. This included arranging for the pre-instructional activities which occurred at the worksite to conduct needs assessments and literacy task analyses, as well as the manipulation of staff, schedules, budgets and space to smoothly implement transportation and instruction on clock time in a designated timeframe. Representatives of each organization were at a level of decision-making authority to quickly resolve problems as they surfaced, which helped to minimize the barriers to success that the project encountered.

The main barrier to success was the lack of commercial readiness of JSEP for private sector use. Despite supplier claims that the hardware and courseware were at a marketable stage of development and were priced accordingly, it became obvious as the project progressed that the suppliers considered the partnership purchasers to be filling the role of a field test or beta test site for the product, even though the partnership had paid for a market-ready, fully supported program.

This lack of product readiness, as demonstrated in numerous delays and equipment and courseware failures and problems, coupled with the suppliers beta test attitude in responding during the tight timelines of the project, added enormous pressure and stress to the operation of the collaborative. Had the actual status of the JSEP program and level of required ongoing technical troubleshooting been known at the time of project conceptualization, it is doubtful that the partners would have agreed to participate.

Results of the Product Evaluation

Learners were asked if they would recommend the course to co-workers and why, and to suggest changes. Eighty eight percent said yes they would. Reasons mentioned most often were related to brushing up on basic skills and upgrading computer skills to qualify for job advancements.

Learners rated JSEP as high on interest and above average for usefulness both on the job and outside the job. Most felt that the course was at an appropriate level of difficulty, although not quite what they had expected, and that learning to use the computer had been a somewhat simple and easy task. Many learners felt that the course had helped them meet personal and work-related goals and offered examples of improvements in content-based job reading and math activities. More than half the learners were able to complete 705 or more of their prescribed JSEP lessons in 40 hours.

Learners, the instructor, and line supervisors all noted improvements in worker self-esteem and job interest. Supervisor ratings indicated some performance improvements in the areas of accuracy, productivity, attitude, and ability to work more independently. Supervisors also thought that JSEP had a positive impact on department teambuilding and on preparation for handling future technological upgrades on the job.

Areas of concern suggested by the open-ended question responses focus on the duration of periods of instruction, the lack of individualized job-related course content, and JSEP student record management problems.

Summary of Evaluation Results

Interviews and examination of program documents and data reveal several goals and objectives for the JSEP Technology Transfer Partnership Project. Among these are:

- Ability to provide computer-based instruction in those basic skills applications necessary for competent performance of the critical job tasks identified by the employer;
- Production of a procedure for customizing JSEP instruction to meet the needs of employers which can be replicated easily;
- Evidence of user-friendliness of JSEP courseware and hardware, and the lab environment;
- Evidence of adequate training and technical support by producers for the use of hardware and courseware; and
- Evidence that the process for establishing and maintaining an industry-education partnership for the purpose of providing a JSEP workplace literacy program is a replicable model.

This is an ambitious list of goals. Interviews and document analysis suggest that emphasis to various goals and objectives of the project may have differed significantly among key personnel as the program became operational. The area of program development process appears to evidence these differences and to be directly related to program strengths and areas of concern.

Providing job-related basic skills applications. Based on the data collected from the line supervisors and employee learners, there is evidence that the content of the customized JSEP lesson prescriptions was related to competent performance of requisite job tasks at Peavey. This can be documented through self-reported learner evaluations of specific skill improvements resulting from JSEP participation and through supervisor performance ratings denoting improvements in productivity, accuracy, attitude, and job knowledge.

Additionally, examination of the process of employer identification of critical tasks and the conduct of literacy task analyses, (by which the contents of JSEP lessons was arranged into customized prescriptions) is also evidence of the ability to create a direct match-up between employee performance requirements and the instructional content of JSEP.

Production of a replicable procedure for customizing JSEP. The process used by the workplace literacy consultant as delineated in project documents is one that has been utilized in the private sector and with the U.S. Army Europe to provide job-specific workplace literacy programs for employees and enlistees. Having employers identify critical job tasks/positions, documenting the results of literacy task analyses conducted on those tasks and positions, and then creating or customizing instruction for those basic skills applications actually used in the workplace is a design that can be replicated to meet individual employer needs.

Examination of the process as it unfolded during the project indicates that its implementation (and resulting customized instructional content) was carried out without problems. This was due in part to the cooperative attitude of the employer who facilitated activities (i.e., literacy task analyses, needs assessment administration).

User-friendliness of JSEP courseware and hardware. The evaluation data and project documentation produced mixed results on evidence of achievement of this goal. Learner data from survey sheets indicates that the majority felt that learning to use the computer for JSEP was a simple and easy task. Learners also indicated that the difficulty level of JSEP courseware was appropriate to their abilities. Observations by the evaluator of JSEP operations in the lab revealed a calm, business-like atmosphere in which learners were intensely involved, but "comfortable."

These measures are indicative of user-friendliness. However, the instructor's log and the learner comments about JSEP management and hardware systems indicate less than satisfactory interface with the system and learner frustration with such things as the length of the keyboard orientation, the use of the light pen, and the inaccuracies of learner record keeping. Also, the number of problems and equipment failures experienced by the instructor over the course of the project reduced the instructor's opinion of the courseware and hardware user-friendliness.

Adequate training and technical support. The lengthy list of equipment and courseware problems encountered during the demonstration is outlined in the instructor's log and correspondence between the site and the supplier team. Technical support is in evidence throughout the project. However, the quality of the product delivered was less than satisfactory to meet the needs of use in the private sector.

Neither hardware nor courseware were at a level of sophistication to be marketed. Correspondence from the suppliers to the site reveals a gross mismatch between the readiness description of the systems given in proposals to the site and the actual systems purchased, which the suppliers categorized as being at "field-test" and "pilot" level functioning capacities. Technicians responding to reported problems did not have concrete answers or explanations for the site. Additionally, the suppliers seemed to have independent agendas and excessive interest in acquiring learner data for their own purposes, rather than focusing on providing timely technical support to the project site.

Training on content management and systems operations that was provided by the courseware developers and by the hardware suppliers was less than adequate. This may be due in part to the nature of the program split between a computer-language instructional system and computer hardware system on which the language can run, developed by two different (albeit related) contractors.

However, the methodology employed to train instructors and the consultant was not at a practical level, nor of a proper length to result in the appropriate "comfort level" needed by trainees to embark on project implementation. The lack of dedicated training staff during training both at FSU and at Ford Aerospace also may have impacted on the amount of confusion the learners reported feeling at the end of the sessions. Additionally, the omission of remunerable JSEP instructor training from the initial proposal and subsequent contract with the site, may have caused some of the training inadequacies noted in process documentation for the project.

Industry-education multi-funded site model replication. The partnership for this project was built on existing relationships within the community and on existing ties with the Governor's Office. This made funding arrangements, selection of representative personnel, channels for communication, and the decision-making process easier to implement than would be the case in the formation of a new partnership.

Successful replication of this model, therefore, would be considerably easier in communities where there is an existing industry-education partnership. Additionally, the Governor's Office would need to be actively interested in promoting such partnerships and programs in order to be of assistance with funding the project.

Given the enormous amounts of stress on the partnership which resulted from delays and concerns related to equipment failure and courseware problems during the tight timeframe of this work-time participation program, the partners demonstrated that strong commitment and common goals can enhance the likelihood of partnership and program survival.

Recommendations

These recommendations address the development of customized JSEP instruction to fit the needs of specific single industries; the process of building and maintaining a partnership effort between business and education entities in a community; and the possibilities for institutionalizing, expanding and replicating the demonstrated use of JSEP in the private sector.

The Development of Customized JSEP instruction. The employee basic skills application needs of Peavey were able to be met for the four positions management felt were critical to current and future operations. The processes of identifying critical tasks with the employer, conducting literacy task analyses, and developing and administering needs assessment instruments were key steps in successful program development.

That the data indicated a match between JSEP lesson content of customized prescriptions and the results of the aforementioned processes reveals that it is possible to customize JSEP to meet the needs of single employers. However, the results may be contingent on the level of expertise of the personnel implementing this procedure.

Therefore, it is recommended that:

- training be developed for conducting identifying and documenting basic skills needs and employee levels of operation in the workplace

(i.e., working with employers, conducting literacy task analyses, and developing and administering needs assessment instruments based on workplace materials),

- training be developed for the process of matching the content of JSEP lessons to results of above processes for identifying employer needs, (i.e., creating customized JSEP prescriptions), and
- JSEP courseware be modified to allow for duplication of customized prescriptions to facilitate more effective use of instructor time.

Building and maintaining a partnership. Community partnerships need to be established among partners who share common goals and who have high levels of commitment. Based on the development and implementation processes for the partnership in Mississippi, it is recommended that industry-education partnerships be attempted by organizations who have a history of previous joint activities and cooperation.

The project partners had already established representative members at a decision-making level of authority, regular communication, a knowledge of each other and history of working collaboratively together. They had also identified common goals for the betterment of the people in their community and thus were committed to the success of the project. These factors appear to have been important to the survival of the project under documented duress. Additionally, the partners had ties with the Governor's Office, which was actively interested in promoting the project.

To successfully replicate the project as a model program would require similar working relationships. Therefore, it is recommended that the partners be identified as those who either have a previous history of successful collaboration, or who can duplicate the characteristics embodied in the Mississippi relationships.

Institutionalizing, expanding and replicating the JSEP project. Before the partners in Mississippi can consider the future of JSEP, they need to know the status of JSEP in regards to its being public domain material. If JSEP is under copyright to the suppliers, it is unlikely that the partnership will continue to use it for employee instruction beyond the version that now exists and they use. It is likely that they will look for alternate instruction. If, however, JSEP is available in the public domain, it is likely that Meridian Community College will purchase additional student workstations to increase their capacity for service to Peavey and to other members of the local business and manufacturing community.

In personal interviews, the partners expressed interest in expanding JSEP through development of new lessons that better fit the current needs of changing positions and tasks in industry. Given the lack of readiness of the existing JSEP courseware and companion hardware system for the private market, as well as the high cost of the dedicated hardware, the partners have indicated a desire to look for other suppliers, should JSEP be in the public domain.

Therefore, it is recommended that:

- other interested multi-funded private sector sites be apprised of the actual lack of readiness status and costs of the existing system;

- the suppliers adequately prepare the system for marketing in the private sector, if they choose to become a supplier to employers, prior to proposing or contracting for provision of what is described as a fully functional program. This may require more demonstrations and field tests, in which the courseware and hardware they supply should be noted as such and priced accordingly; and

- the issue surrounding the status of JSEP as material available in the public domain should be resolved as soon as possible to determine whether this project or any additional projects should receive funding for the purpose of further testing or expanding its application in the private sector.

Conclusion

Based on the analyses of data and materials collected during this evaluation, it is clear that the JSEP courseware has the potential to meet the needs of single employers in the private sector. Its effectiveness is evidenced in learner progress, in positive changes in performance on the job, and in both the evaluative and attitudinal statements and behaviors of participating learners, instructor, managers, administrators and supervisors. Therefore, these recommendations should be carefully considered before further replication takes place.

WHITE PLAINS JSEP PILOT SITE REVIEW

The following review of the White Plains (NY) Continuing Education Center JSEP pilot site was prepared based on site visit research. This pilot program is the first civilian test of the Job Skills Education Program (JSEP) in an adult education center setting. The program includes two hours daily working on JSEP, and 2 hours daily of classroom instruction. This section profiles the White Plains JSEP program.

Background

The White Plains JSEP pilot opened in June 1989. However, planning had begun considerably earlier. The New York State Education Department had been tracking the development of JSEP since its inception. Therefore, when Florida State University (FSU) and Ford Aerospace, the developers of JSEP, received a grant to test the program in civilian populations, they were contacted by the Education Department to discuss the possibility of testing the program in New York.

Garrett Murphy, the New York State Director for the Division of Continuing Education, worked with Florida State to develop the criteria for test locations. These included a large number of students, an administratively well run program, and the availability of low level functioning, minority and public assistance participants. After considering several sites meeting these specifications, the Division of Continuing Education selected White Plains Continuing Education Center.

Before agreeing to participate, the White Plains Continuing Education Center held discussions with the White Plains Board of Education, and an agreement was reached to obtain a package of funding from New York State. Installation and maintenance of the required MicroTICCIT hardware is a substantial expense. In addition, there was some initial hesitation on the part of the School Board to pilot a program that had previously been used only in the military. Eventually, the state put together a funding package that consisted of contributions from various sources, including Job Training Partnership Act (JTPA) and Adult Education and Continuing Education.

To adapt JSEP for this civilian test, staff at Florida State University worked with White Plains Continuing Education Center Director Andy Morzello and his staff to develop lesson plans for each of twenty occupational groups. The White Plains staff performed a task analysis for each occupation. Based on this analysis, Florida State designed customized lesson plans for each occupation.

The twenty occupations are accounting clerk, auto-body repairer, bookkeeper, carpenter, clerk-typist, computer operator, corrections officer cosmetologist, electrician, electrical assembly technician, firefighter, floral designer, home health aide, licensed practical nurse, machinist, nurse's aide, plumber, police officer, record keeper, and word processor.

Some of these occupations correspond closely to occupations in the army, but others required entirely new combinations of lessons. In a few cases, one or two new questions or examples were inserted to avoid the creation of significant gaps where

inappropriate material had been deleted. Florida State staff also worked to eliminate some of the military references, terminology and examples. This process is referred to as "degreening," and is felt to be necessary to make JSEP useful for a civilian population.

The four month pilot started in late June 1989, but was interrupted for two weeks vacation in late August. The pilot was later extended for several months to allow more students to have sufficient time to complete their lesson prescriptions. When the pilot is finished, White Plains plans to continue JSEP, although additional funding will be needed to support it.

White Plains Continuing Education Center

The White Plains Continuing Education Center offers academic, vocational and recreational classes to both adults and youngsters. It primarily serves the White Plains School District, but classes are open to people outside the district for a higher fee. It is located in the Rochambeau School which currently also houses an alternative high school, but offers classes at several other locations as well. In addition, under arrangements with area businesses, courses are provided for employees on site at the firm's place of business.

The Students

The student population in the White Plains JSEP is largely minority --especially Latino and black. Currently most students are taking JSEP as part of either an Adult Basic Education, a GED or an English as a Second Language program. They participate in JSEP two hours daily, and in a traditional classroom two hours daily. The population includes JTPA participants and welfare recipients, as well as the general public who were attracted to JSEP after reading promotional material. They range in age from 17 to about 70, with a majority being in their 20's.

The center is in the process of working out a plan for high school students to use JSEP. The center is co-located with an alternative high school. In the future, it is hoped that arrangements can be made for labor union apprentices and employees referred by corporations to take advantage of JSEP.

Informal discussions with the students and instructors indicate that the students enjoy JSEP, and are highly motivated to succeed at it. As noted above, observations confirm that it holds their attention. As part of the pilot, the students complete periodic questionnaires to register their reactions to JSEP. These will be examined and evaluated by Florida State staff, but review by the instructor indicates that students are generally satisfied with the program.

At the time of the NAB visit, seventy-two students were participating in JSEP. The facilities are presently open to students from 9:00 to 1:30, but they are scheduled to come in for either the first or second half of the morning.

The Instructors

One instructor and her assistant are responsible for all 72 students, two classes of 36 students each. In addition to responding to student questions, their duties include setting up the program every day, backing up the files at the end of the day to insure

that all work is saved, correcting paper and pencil components of JSEP, requesting corrections from Ford Aerospace when errors in JSEP are found (this happens quite frequently), and resolving technical hardware problems which created software problems. Resolving technical problems proves to be time consuming, and especially in the early days of the pilot, frequently required long telephone conversations with Ford Aerospace or FSU staff. When problems cannot be solved this way, Ford or FSU send out an expert to help. Nevertheless, the staff found the number and extent of technical problems frustrating.

Project Director Andy Morzello believes that with fewer technical problems, he would be able to keep the JSEP facilities open during the afternoon, but that presently his staff must work on these problems during the afternoon in order to keep the system operative on a regular basis.

JSEP -- The Program

JSEP students at White Plains must select one of twenty occupations (see the background section above) before starting the program. This selection determines the specific JSEP lessons that they must complete. Andy Morzello emphasizes that the purpose of JSEP is to provide a foundation in basic skills, and not provide technical skills training. The JSEP lessons prepare students for skills training; in essence they enhance their trainability for a particular occupation, or give them the prerequisites for the skills training. For example, both nurse's aide and carpenter lesson plans would include lessons on measurement and on fractions.

Most JSEP lessons require at least a 4th grade level, but a 5th-6th grade level generally results in a greater level of success. The White Plains JSEP participants take the Test of Adult Basic Education (TABE) before they are assigned to JSEP.

Each lesson plan includes both verbal and math lessons. The students may select a lesson from either area, but once they have started a lesson they must complete all sections of it before continuing to another lesson. Certain elementary lessons must be completed before related advanced lessons may be selected, but usually at any one time a student has a choice of at least two lessons.

Each lesson consists of a short overview of the subject matter. After that, the student takes a "pretest". If they pass it, they may skip the rest of the lesson. If they do not, they take the detailed lesson, and then take the test at the end of the lesson. This test, if failed, may be taken over when they have completed the remedial questions.

Some students have complained that they are not told which questions they answer incorrectly on the tests. The instructor is somewhat sympathetic. However, because the "take over" tests are identical to the initial test (except the questions are scrambled), FSU staff believe that answers should not be made readily available.

JSEP uses color in the text to emphasize words and differentiate choices, and also has color graphics -- graphs, charts, diagrams, and also pictures. Positive reinforcement is given frequently. When a correct choice is selected, "Good" or "Great" or another positive comment, indicates that the choice is right. This expression is often in color capital letters. After a test has successfully been passed, the whole screen lights up with "What a great job!" or the like.

Although Florida State substantially "degreened" JSEP there are still many military references. NAB staff observed illustrations of soldiers, and the instructor told us for example, that "soldier" is frequently used instead of "person", and that the abbreviation for ammunition "ammo" is also used. None of the White Plains students have complained about the military terms and examples. However, Andy Morzello and his staff believe substantial additional degreening would be needed before JSEP could be marketed for civilian use. (see further discussion below).

Satisfaction with JSEP and Potential for Further Civilian Use

Overall, the staff, director and students are satisfied with the content of JSEP, although they emphasize that it must be used in conjunction with other instruction. For example, most at-risk students require some instruction in learning how to learn and building self-esteem that can best be taught in a classroom setting. In addition, classroom instruction is needed to teach listening, speaking and vocabulary skills.

Andy Morzello notes that JSEP is by far the best of the many computer-based basic skills packages that he has worked with. In terms of expansion for further civilian use, customization would be essential, and further "degreening" would be necessary. Andy Morzello is in the process of negotiating JSEP use by high school students; he believes some parents will object to the military terminology, examples and illustrations. He thinks further degreening would also be necessary before private sector businesses could use JSEP.

FSU performed all the customization for White Plains (designing lesson plans for the 20 occupations selected by White Plains, and substituting civilian examples for deleted military examples where necessary). However some potential civilian users may wish to do their own customization and authoring. Under their pilot agreement with Florida State, after the set of occupations and customization was agreed upon, White Plains staff were not authorized to do additional customization during this test period. An examination of the possibility for more flexible agreements might be required in order to allow other civilian organizations to use JSEP.

Another potential barrier for expanded civilian use is the large number of technical problems. While White Plains staff report that both Ford Aerospace and FSU have been attentive in helping resolve these problems, the time that the White Plains instructor must spent on them has prevented the JSEP facilities from being open longer hours (it is currently open 9:00 - 1:30).

Another potential barrier to expanded civilian use is cost. Although cost must be evaluated in terms of both expected gains in future productivity and of the breadth of knowledge covered and number of students served by one instructor, it should be noted that White Plains was only in a position to field test JSEP because the state bought the MicroTICCIT hardware. Not only is MicroTICCIT expensive, but maintenance costs are high, it does not normally have word processing capabilities, only MicroTICCIT courseware may be used on it, and some believe that it is becoming outdated. Some basic skills providers might prefer purchasing video disk basic skills courseware, which has become available in the last year or two. Video disk software has the some color and graphics capabilities as MicroTICCIT, but is compatible with personal computers.

In summary, the White Plains staff think that the content and style of JSEP itself warrant expanded civilian use. However, before it could be successful, the potential

barriers discussed here -- degreening, customization, technical problems, and cost -- must be resolved.

CIVILIAN USE OF JSEP ON MILITARY BASES

NAB contacted personnel at five military bases with established JSEP programs to discuss their JSEP experience and explore the possibility of civilian use of JSEP on the bases. The bases were: Fort Dix, New Jersey; Fort Jackson, Columbia, South Carolina; Fort Lewis, Tacoma, Washington; Fort Riley, Junction City, Kansas; and Fort Sill, Lawton, Oklahoma. Discussions were held with program administrators at all five bases, and also with instructors at two bases. On-site visits and followup telephone calls.were made to Fort Jackson and Fort Riley. Telephone interviews were conducted with staff at Fort Lewis, Fort Dix and Fort Sill.

This section presents the findings from the NAB discussions with military base personnel. Although there were some differences in opinion between staff at different bases, generally these were minor; therefore, individual bases are not identified in the discussion.

NAB's two major findings are that staff at all bases believe that under the right circumstances, JSEP is an effective means of teaching certain basic skills, and that the prospects for civilian use of JSEP on military bases do not look good primarily because of lack of available space (JSEP workstations are usually in use for long hours five or six days a week). These and other findings are presented here.

Use of JSEP

JSEP lessons. JSEP was designed to be used to enhance trainability for specific occupations as designated by "MOS" codes. Instructors have the capability to customize the selection and sequence of lessons to meet the needs of individual students in pursuing a specific occupation. However, JSEP is in fact generally not used for this purpose, but is instead perceived as a means to improve scores on the General Technical (GT) composite of the Armed Services Vocational Aptitude Battery. Specific JSEP assessments are not always done, which means some students end up working through all lessons when they should have placed out of many of them. One instructor did stress the importance of a pretest, and of tailoring lesson prescriptions to individual soldier's needs.

Some bases use JSEP in conjunction with paper and pencil units. These bases may elect not to use the JSEP lessons that staff consider to be poorly designed and presented. Math lessons are believed to be better than verbal lessons. One instructor noted that although grammar is presented quite well, vocabulary skills are more limited, and reading skills are weak; he will not admit soldiers without adequate reading skills. At another base the administrator believes that JSEP should not be used for students with less than an 8th grade reading level, and is even more appropriate for students with a 9.5 reading level. He also noted that to prepare for army tests, extra vocabulary and reading comprehension lessons must be given.

At one base, a control group experiment was being conducted at the time of the telephone interview. JSEP was being used to teach two MOS classifications, cook and driver. The experimental groups received JSEP lessons according to the results of a pretest. On average, cooks receive 44 lessons, and the drivers receive 48. It usually takes them two months to complete this prescription, working a maximum of 2 1/2 hours daily, mostly in the evening. The results of this test were not complete at the time of NAB's interview.

Computer System. The five military bases use JSEP on either MicroTICCIT or PLATO computer systems. Three use PLATO and two use MicroTICCIT. MicroTICCIT uses color and is thought to have better graphics and a better response time than PLATO. However, bases using PLATO do not appear to be highly dissatisfied. At one base using PLATO, the respondent noted that soldiers have not experienced color or sophisticated graphics, and so have no basis for comparison, but did note that the response time for PLATO is slow. But at another base using PLATO, staff felt the authors had selected slow graphics, and that it was not part of the system, and at a third, response time seemed to be dependent on the number of people using the system.

Staff at the two bases using MicroTICCIT are satisfied with it. At one of these, the students and instructor think the color and graphics are essential. At the other base, the instructor remarks that maintenance costs for MicroTICCIT are high ($19,000-20,000 annually).

Set up and Logistics. The number of work stations available for JSEP varies between 14 and 25 across the five bases. At some locations, some work stations are not restricted to JSEP. No plans are being made for expansion, but one or two bases are likely to experience a reduction in the number of work stations.

JSEP facilities at all bases are open year round. All facilities are open regular daytime hours five days a week. Three bases also have early evening hours Monday - Thursday (until 7:30, 8:00 or 9:30). A fourth is open one or two evenings a week, and at the time of the NAB interview, the fifth was open 11:30 a.m. to 8:00 p.m. on an experimental basis twice a week. Only one base has regular Saturday hours. Previously this site also had Sunday afternoon hours but had to curtail them due to funding cutbacks.

Generally, JSEP facilities are used close to capacity. Sometimes, commanders will arrange for a group of soldiers to participate in a sequence of lessons for a week or two. Some soldiers are assigned to come in for a fixed number of hours on a regular basis, while others come in on an ad hoc basis. It is usually difficult to predict how crowded a JSEP facility will be at any time.

Base Involvement with Community/Civilians.

NAB asked respondents about base involvement with the community and about participation of civilians in base activities because it was thought that bases with greater interaction with civilians would more likely be receptive to opening JSEP facilities to civilians.

Community Involvement. All bases contacted have some kind of interaction with their local communities, although not generally with the business community. This interaction is most frequently through arrangements with community or four year colleges to teach courses on the base. Although these courses are designed for military personnel, they are sometimes open to dependents and civilians.

The only business contact reported resulted because the schools in the area of one base adopt one unit of the post and one business, and this triad works on activities together. Another base is also involved with the local school system because several elementary schools are located on the base.

Staff at the only one of the five bases where civilian use of the base might create security problems because of base activities, nevertheless reported that recreational and cultural exchanges between military personnel and civilians take place both in the community and on the base.

Restrictions on Civilian Use of Base Facilities. At these bases access to facilities by civilians did not seem to be primarily a security concern, but more an issue of lack of available space. Generally, a few civilians attend some classes on a space available basis. At one base, offering classified weapons training, there is a potential security problem. However, even at this base civilians sometimes participate in community college classes that are given on base.

Potential for Civilian Use of JSEP on Military Bases

NAB asked respondents if JSEP was suitable for civilian use, and about the possibility of groups or individuals using the military JSEP facilities. As indicated above, the level of community involvement, and the virtual absence of restrictions on civilian use of this type of base facility suggests that civilians might successfully be able to use JSEP on base, but as discussed below, this turns out not to be the case.

Suitability of JSEP for Civilians. There was general agreement that JSEP could be used in certain situations for civilians. However, while one or two of the respondents were fairly enthusiastic about its potential for civilian use, at least one was considerably more cautious. It was felt that JSEP should be used for occupations with similar skills and knowledge requirements to those it was designed for in the military. One respondent noted that JSEP is best if used with supplementary material, and another that the Math sections would be the most appropriate for civilians.

Some respondents felt strongly that JSEP should be customized for specific programs, and there was general agreement that it should be de-greened (military terminology removed). One instructor noted that female military dependents complain about the military emphasis. There was not agreement about whether it would be necessary to change military examples.

Problems Preventing Civilian Use of JSEP. Although one respondent mentioned security reasons, the overwhelming problem preventing the use of JSEP by civilians is that, at these five bases, workstations would not be available on a regular, consistent basis. Although not always filled to capacity, space is at a premium, and it seems to be a general rule that it is difficult to predict when space will be available, and that it could not be guaranteed. Because all JSEP facilities are open at least one or two evenings, in addition to five days a week, community use would be limited to late evenings or weekends.

Other concerns about civilian use include the greater exposure of JSEP to breakdowns, and the costs of additional routine maintenance. Assuming that a civilian group could arrange to teach a class during the weekend, one respondent noted that they would be much more receptive to a community college than to a business--particularly to a college already offering classes on the base.

Individual Students. As it seemed unlikely that there would be space for classes of civilians to participate in JSEP during normal weekday/evening hours, NAB asked

about the possibility of individual students participating. Although respondents were not averse to this idea, they said it would still be difficult to guarantee a work station during a certain time period. Problems of calculating the cost of instructor/tutor time were also mentioned.

One base actually has had a few civilians participate in JSEP. However these have primarily been potential recruits, sent by recruiters to improve their chances of getting into the military. This respondent thought that the most realistic arrangement would be for a civilian group to "dial in" to the system after 7:30 p.m. or at weekends, but use its own terminals. The army could be reimbursed for maintenance and electricity, but an arrangement would also have to be negotiated with the federal Joint Commission on Computer-Based Instructional Systems (which oversees the use of computer-based instructional systems at bases using PLATO) regarding use of the system. A respondent from another base also mentioned that they are looking into setting up an off base terminal.

Since the initial discussions, NAB has learned that two or more dial-in ports have recently been installed in the JSEP facilities at all TRADOC (Training and Doctrine Command) bases, including Fort Sill, Fort Dix and Fort Jackson. (All TRADOC bases use PLATO.) This might faciliate the use of JSEP by civilians. However, the dial-in ports have been attached to *existing* terminals -- allowing them to be used *either* in-person *or* by dialing-in; the lack of *new, additional* terminals would still restrict civilian use to the limited times when terminals are available.

Summary

In summary, based on our interviews with military personnel at five bases using JSEP, NAB found general satisfaction with JSEP, particularly the Math sections, when used in conjunction with other teaching methods. Most respondents also thought, that with modifications, JSEP would be suitable for civilians.

Civilian use of JSEP on military bases does not appear to be a realistic possibility, not generally because of security reasons, but because of lack of available work stations. JSEP facilities are opened five days a week, and at least one or two evenings, and although not always operating at capacity, available space could not be guaranteed on a regular, consistent basis.

If arrangements were to be contemplated for a civilian group to use JSEP facilities during a weekend or in an evening when the they were not in use by the Army, the respondents emphasized that they would not be the right people to talk to, but that an agreement would have to be worked out with the appropriate officials. In negotiating this agreement, contributions to the costs of electricity, routine maintenance, and other operational costs, as well as responsibility for unusual repair costs, and arrangements for instructors/technicians to supervise the use of facilities would be some of the items for consideration. One respondent noted that a community college, particularly one already teaching classes on the base, would be a more appropriate group than a company to sponsor civilians.

Recommendation

Any attempt to experiment with civilian use of JSEP on military bases should be approached with caution. If both a community college and a military base are enthusiastic about setting up a civilian class to be held while the Army JSEP

facilities are closed, the items noted above should be carefully considered. A demonstration class, to be evaluated before it is continued would probably be the best approach. However, once this possibility has been carefully considered, it may be decided that potential problems such as deciding liability for equipment breakdowns, may prevent the implementation of this project.

INTEREST IN JSEP AT COMMUNITY COLLEGES WITH MICROTICCIT

Community colleges have been involved in remedial and basic skills training for many years. They provide basic skills training directly to their own students in preparation for regular college level courses, and also to employees either in a group on a contractual basis with firms, or on an individual reimbursement basis. Some community colleges use computerized systems for some of all basic skills training. With this experience, it seemed logical to explore the possibility of field testing JSEP at community colleges.

Because JSEP must be used with either the MicroTICCIT or PLATO computer systems, selected colleges with one or both systems were contacted. Since the expense of installing and operating one of these systems would be prohibitive if it were only to be used for JSEP, sites to be contacted were limited to those with already established systems.

One such community college, Meridian in Mississippi, is already involved in a JSEP demonstration. Findings from that demonstration are reported elsewhere. For this study, visits were made to Gateway Community College, which is part of the Maricopa County Community College system in Phoenix, Arizona, and to the Alexandria campus of Northern Virginia Community College (NOVA). In addition, telephone discussions were conducted with staff at St. Louis Community College at Meramec in St. Louis, Missouri, at a company program at Burlington Northern, which is affiliated with Johnson Community College in Overland Park, Kansas, and at Brigham Young University, a four year university in Provo, Utah.

The following section summarizes the general findings from NAB's visits and telephone discussions. That is followed by specific findings related to the feasibility of field testing JSEP at community colleges.

General Findings

Current Basic Skills Programs. Four of the educational institutions contacted by NAB currently conduct basic skills/remedial courses for students. The Burlington Northern program affiliated with Johnson Community College does not conduct basic skills training, but is looking into it in order to better prepare employees for the skills training. TICCIT or MicroTICCIT is currently used or has been used at all institutions, although it is not always used to provide the bulk of basic skills/remedial education courses. PLATO is used on a much more limited basis.

Satisfaction with MicroTICCIT. Three of the five respondents (St. Louis Community College, NOVA, and Burlington Northern) report high levels of satisfaction with TICCIT/MIcroTICCIT. The editing and authoring modes, recordkeeping abilities, ease of self-paced instruction, and the means for insuring competency before progressing, were cited as reasons for liking the system. Another respondent felt that the advantages of MicroTICCIT are less than they were a few years ago now that similar capabilities are available through PC compatible software.

Potential for field testing JSEP. JSEP did not generate extensive enthusiasm, partly because it was felt that adaptions would be necessary, and it is not clear to what degree editing and authoring options would be available, and partly because if extensive adaptions were required it was felt that it would be better to author a system from scratch.

However, some interest in exploring JSEP further was expressed by respondents at St. Louis Community College, NOVA and Burlington Northern. If a field test is developed, it would be worthwhile contacting these organizations regarding participation. However, it should be stressed that they all would want more information before deciding to participate in such an undertaking.

Current Basic Skills Programs at Each Institution

Although four of the institutions contacted currently offer basic skills, the size and nature of these efforts varies considerably.

NOVA, Alexandria, Virginia. NOVA has been using TICCIT for several remedial programs, but will convert to MicroTICCIT starting on a pilot basis in January 1990. Algebra 1 and 2 are offered and also English Grammar. However, the latter, which many international students take, is not considered remedial. Non-computerized classes are also offered but are not as popular. English as a Second Language courses are offered, but are not presently computerized.

NOVA has also conducted a number of basic skills courses for governmental and private organizations. However, these do not use TICCIT or computer software. Recently two courses were offered for the Government Printing Office (GPO). Both ran for 40 hours over an 8 week period. One course was basic math, and the other English communications. They have also offered English as a Second Language (ESL). Sometimes material is presented in a functional context, with relevant manuals included in the instructional material.

St. Louis Community College at Meramec, St. Louis, Missouri. Remedial math courses are offered through the Math Lab which has been in operation for 25 years. TICCIT has been used for 2 years. One thousand students are served each semester, and 300 in the summer. Two MicroTICCIT courses are offered -- junior high level math and an equivalent to first year high school algebra. A placement test is given which includes some reading as well as Math, and students with reading levels at 3rd grade or below must take a remedial reading course first. (The MicroTICCIT course requires a 4th-5th grade reading level.)

Remedial reading courses were started more recently, and have 200 students per year. Two courses are offered at different levels. The courses are individualized and self-paced, but the computer is not used. Reading is taught, but the courses also emphasize time management, study survival skills, motivation for learning etc.

Basic skills/remedial courses are conducted for Chrysler Corp. and Southwestern Bell. One of these is conducted at the business site, and the other at a community college -- but neither is geared specifically towards an occupation.

Gateway Community College, Phoenix, Arizona. Basic Skills courses are taught as prerequisites to other courses, and are geared to those courses. For example, there is an English course for secretaries, and a pre-accounting math course. These basic

skills courses are taught in a functional context, and are designed for all students going into that area. Other developmental basic skills course are taught in the general functional context of attending school.

Basic skills/literacy training has been conducted on site for several companies including Motorola, Allied Signal, and Hughes. Literacy is taught in a functional context and related to the jobs of the students.

Gateway staff have taught English as a Second Language to engineers from all over the world and have found that using a functional approach reduces the amount of training need by two thirds. An English as a Second Language course for nurses has also been taught.

For more specific occupation-based skills training an extensive needs analysis is done for the client Task analysis and curriculum development are considered most important -- a conceptual framework is necessary to explain why one must know what is taught.

An unusual program is a new transgenerational project to promote communication between parents and their child's school. Reading and writing are taught in a context to enable participants to benefit from parent-school conferences, and to communicate effectively with the school when desired.

Brigham Young University, Provo, Utah. There is a large remedial, non-credit component for math which does not use computerized instruction. In the past, MicroTICCIT had been widely used for math instruction. It is no longer used in math courses because the MicroTICCIT operation is now under the Department of Humanities. However, 10 -12 students use MicroTICCIT Algebra on their own to supplement their math instruction.

English is taught through the evening school -- and may be taken for credit by non-natives, but only for non-credit by natives. Remedial English and beginning grammar on MicroTICCIT are used by a few students.

No MicroTICCIT basic skills courses are offered to companies/government, although other basic skills courses may be. MicroTICCIT foreign language courses, are however, used by Army personnel.

Technical Training Center of Burlington Northern located at Johnson Community College, Overland Park, Kansas. As noted above, there are presently no basic skills being offered through the company. However, they see the need for some basic skills training in the functional context as a prerequisite to skills training -- to bring employees that are deficient up to speed. Presently TICCIT is used as one of the tools to teach some of the skills training courses. Skills training is done in such areas as welding, electronics etc. Employees come to the center on company time -- courses vary in length. They range from one day up to five weeks.

Use of TICCIT/MicroTICCIT

All five organizations had some experience with TICCIT/MicroTICCIT. Although Gateway Community College did not have *direct* experience, another college within the Maricopa County College system has used MicroTICCIT.

Advantages of TICCIT/MicroTICCIT cited are:

- Excellent record-keeping and testing capabilities, even with high volumes of students
- Authoring system is easy to use and allows courses to be customized or designed from scratch.
- Student-oriented, highly interactive and user friendly
- Courseware is written for adults rather than children, and is particularly effective with students who have failed with traditional instructional approaches
- Students like the individualized pace and the ability to make mistakes and learn from them in private rather than under a teacher's scrutiny
- Facilitates open entry/ open exist instructional programming and flexibility in scheduling that is particularly helpful with adult learners

Disadvantages of MicroTICCIT/TICCIT and Computers in General

- MicroTICCIT is quite expensive --$100-200K for a lab, plus the funds necessary for faculty to author and customize software, service agreements and maintenance.
- There is only one source (Ford Aerospace) for the hardware and customized parts and the parts are specialized and nonstandard . This can mean long waits for maintenance.
- MicroTICCIT is becoming outdated. New hypercard programs and other systems can be used on personal computers, and can do what MicroTICCIT does more easily, without the space and specialized hardware requirements of MicroTICCIT.
- There are minimal wordprocessing capabilities in the authoring mode. In some cases, a mistake may involve retypying an entire page.
- May be most effective for drill and practice, making it better as a program supplement rather than the core curriculum

Use of PLATO

Since colleges were selected because of use of MicroTICCIT, not all colleges had experience with PLATO. PLATO has not been popular because of the high cost and difficulty of authoring. However, it does have the advantage that maintenance is done centrally and not locally.

Conclusion and Recommendation

Based on this review, it appears that four of the five organizations we spoke with, are happy with TICCIT/MicroTICCIT. However, although they have experienced the advantages of using this type of computer system for basic skills training, they

do not embrace JSEP wholeheartedly. Nevertheless, three respondents express interest in learning more about JSEP.

Based on NAB's findings, it is recommended that discussions are held with St. Louis Community College, NOVA, and Burlington Northern regarding a possible field test. However, a decision to implement a field test of JSEP at these institutions should not be made until they have had time to learn more about JSEP, and the resources required for successful implementation.

In addition, before a JSEP field test is contemplated, the issue of possible broader implementation should be considered. Implementation could only become a reality at those institutions/organizations which already have either a MicroTICCIT or PLATO system. The cost of buying either of these systems in order to acquire JSEP would be prohibitive. And, because these systems are becoming outdated, and their previously unique graphic and interactive capabilities are now available on -software compatible with personal computers, it is unlikely that colleges or firms will be purchasing PLATO or MicroTICCIT for their other needs.

For these reasons, a decision to further field test JSEP in civilian settings should take into consideration the results from the ongoing Meridian Community College and White Plains Continuing Education Center field tests, as well as the commitment of the test sites to a strong computerized basic skills program. It should also be understood that while further field testing would probably facilitate some greater use of JSEP in civilian settings, it would be unwise to expect anything close to widespread civilian use of JSEP.

BUSINESS RESPONSE TO JSEP

Background

NAB conducted three JSEP Business Forums for the purpose of educating business leaders on the JSEP product and ascertaining their opinions and impressions about its adaptability to the private sector. These Business Forums were conducted on May 8, 1989 in Cape Cod, Massachusetts; May 19, 1989 in Boston, Massachusetts; and August 24, 1989 in Chicago, Illinois. The Forums averaged two hours in duration.

Each forum began with general introductions, followed by an account by each business participant of basic skills problems experienced in the workplace. Participants described present problems as well as anticipated problems in the future. The occupational areas in which a given company was experiencing problems were also described.

Participants were also asked how they presently determine the basic skills qualifications of applicants and what tools were being used to determine basic skills aptitudes of those already on the job. Finally, participants were asked about any remedial tools or programs being used as well as what efforts or programs had been successful. Participants were asked to describe any partnerships with community or educational institutions had been successful. A discussion also followed which described desired evaluation measures, such as improved job performance.

In terms of more specific discussion, business participants were informed of the goals of the JSEP project, and received an overview of the JSEP curriculum, JSEP applications, equipment and related costs through Ford Aerospace. JSEP was actually demonstrated, via the NovaNet system, at the business forum held in Chicago.

Specific questions were raised concerning the effectiveness of the technology, including whether or not the military terms and graphics would interfere with employees' learning progress and whether color versus non-color graphics make a difference in employees' learning progress. Business representatives were asked what technology they presently used within their company for training, and if they thought that their company would be willing to expend the financial resources necessary to implement a JSEP program.

They were also asked if JSEP could be provided less expensively through a pooling of public/private resources, and whether their company would be willing to release their employees from work to travel to a public location (e.g, a local community college, a PIC contractor) to receive JSEP instruction. Finally, they were asked if they had training personnel already available within their company to provide support and instruction necessary for a JSEP project. Forums generally concluded with suggested recommendations from business participants to the Department of Labor for this JSEP project.

Participants

The Cape Cod Business Forum was held in cooperation with the NAB New England Regional Service Office which was sponsoring a New England-wide employment and training conference entitled the "Yankee Swap." NAB held a special workshop on

workplace literacy and the JSEP project that was attended by representatives from the following companies: Numerica Savings Bank of Manchester, NH; Aetna, Inc. of New Bedford, MA; Fleet/Norstan Financial Group of Providence, R.I.; Education Employment Resources Group of Quincy, MA; The Flatley Company of Braintree, MA; and Productivity Resources, Inc. of Brunswick, Maine.

The forum held in Boston was organized by NAB with the assistance of Howard Feldstein, Director, of the Boston Centers for Innovative Training and Employment (CITE) Program and Cynthia Chorianopoulos of the Boston Private Industry Council. The CITE program had been referred to NAB by the Business Council for Effective Literacy as a model functional-context basic skills and vocational training program. NAB staff met with CITE and PIC representatives as well as representatives from the CITE Advisory Committee, including executives from State Street Bank and Trust Company, Bay Banks, Inc., Little Brown and Company, and New England Medical Center Hospitals.

The Chicago forum was held in conjunction with the NAB Midwest Regional Service Office and included representatives from the following companies: Motorola Corporation, Honeywell Corporation and Foundation, Rockford Product Corporation, Kraft, Inc., Caterpillar, Inc., McDonald's Corporation, and R.G. Donnelley & Inc. This group viewed JSEP first hand through the NOVANET System. (Note that this version of JSEP had not been "degreened", and was monochromatic; unlike the versions used at Meridian and White Plains.)

Findings From the Business Forums

Participants at each forum had similar reactions to the JSEP programs. Because of acute labor shortages, businesses, large and small are forced to hire workers with basic skills deficiencies. Many companies use the GATB test for screening new employees and find that most candidates cannot meet the established level of proficiency for most jobs. Hence, there is a need to develop basic skills training programs in order to improve the skills of existing workers in order to retain them.

In the Chicago forum, a representative from Honeywell noted that persons with basic skills deficiencies are generally employed in entry-level positions- but are unable to advance to higher levels technical skill and responsibility because they do not have the necessary skills. Honeywell has a large number of employees in higher level labor jobs who are retiring- this is causing a major human resource problem for the company. New England participants felt that the need for basic skills training is especially acute in the health care and banking industries.

General impressions of JSEP technology were very positive. Learning basic skills via computers was extremely attractive, and some said, necessary to most companies. Many stated that the sophisticated technology of the workplace requires computer literacy. However, the software for JSEP needs to be adaptable to current, widely used mainframes such as IBM, Tandem, and DEC (which were the most frequently noted), because business cannot afford to invest in additional computer hardware. For instance, Boston's, CITE program uses the Apple computer which is especially attractive because of its versatility and portability in transporting it to various company locations.

Participants were open to the notion of working with institutions of higher education for basic skills training in support of business' needs. In fact, many companies are

already involved in partnerships with public institutions to help provide this training. In Chicago, the Motorola representative remarked, "Out of 60,000 of our domestic employees, 10,000 have been identified as having a basic skills problem. Motorola provides for those employees, working heavily with community colleges for basic skills training." Similarly, the representative from Caterpillar noted, "Employees have been given math and reading comprehension tests (such as the GATB) and 14% of employees are deficient in one or two areas. We use community colleges for training support."

Although the participants were receptive to the JSEP program, a few concerns remained, the primary being that the cost via Ford Aerospace is prohibitive, and some believed excessive. All of the companies represented at the forums stated that they would be unable to afford MicroTICCIT.

Another issue raised by all employers represented was that the military terms and graphics in the JSEP program would interfere with the learning progress of persons employed in the private sector. They claimed that they would be distracting and inappropriate for a business work setting. Also, the attendees felt that the utilization of colored graphics was important in a business setting.

In conclusion, the participants generally agreed that the JSEP program was effective and interesting and would be successful with the following vital changes:

- The cost of purchasing JSEP through Ford Aerospace needed to be reduced if it were going to be marketed in the private sector.
- The JSEP software needed to be adapted to more widely used mainframe systems that were common in the business community.
- The military terms and graphics needed to be removed for JSEP to be acceptable in a business environment.

SUMMARY OF JSEP SYMPOSIUM

NAB organized a symposium of JSEP developers, users and government funding agencies to discuss what the next steps should be in the process toward further development, demonstration and dissemination of JSEP. This symposium was held November 30-December 1, 1989 and was attended by representatives of the Department of the Army (DOA), the Department of Labor (DOL), the Department of Education (DOE), Florida State University (FSU), Ford Aerospace, New York State Education Department, Meridian Community College, Peavey Electronics Corporation, the Mississippi Governor's Office on Literacy, and the National Alliance of Business.

Many issues, primarily related to the further development and refinement of JSEP for use by various civilian populations, were discussed. The aim of the meeting was to bring all parties together to openly discuss these issues, and to provide NAB with reaction to findings reached over the course of the project. It was not expected that there would be consensus on every issue, although in fact there was *general* agreement on a number of issues.

The points discussed are summarized briefly below. Where the term "general agreement" is used it means that most of the participants seemed to agree with the major aspect of that issue or recommendation. It should be noted that no votes were taken, and that at times general agreement was inferred from the fact that no *disagreement* was vocalized.

Points of Discussion

- **Utility of JSEP.** There was general agreement that JSEP is currently one of the best computer-based systems available for the instruction of basic skills in the general context of certain specified occupations. It is particularly strong in teaching problem solving and math skills. Although the JSEP curriculum has a verbal component, for vocabulary, reading, and to an even greater extent, speaking, listening and writing skills, it was generally agreed that JSEP must be supplemented by classroom instruction.

- **Degreening.** Florida State representatives emphasized that for the Meridian and White Plains demonstrations, they had been instructed to conduct the *minimal* amount of degreening necessary for JSEP to be acceptable to a civilian population.

  The representative of Peavey Electronics, speaking as a customer and business, had understood that they were getting a completely degreened product. However, the instructor received verbal complaints about the choice of some *topics*. For example, a lesson teaching skimming and scanning discussed how to kill, clean and cook rodents. The early results from the White Plains evaluation conducted by Florida State indicate that although students are aware of the remnant "greenness", they do not find it distracting.

  There was general, but not complete agreement among Symposium participants, that *further degreening* should be done before JSEP could be

marketed to the private business sector. There was less agreement about the extent of additional degreening required for expanded use by public sector programs (adult education, JTPA etc.).

- **Customization.** Customized lesson prescriptions were created for both the Meridian and White Plains demonstrations. Customizing prescriptions is a fairly simple job and does not involve changing the JSEP lessons. It is most easily done by conducting a survey of the prerequisite skills required for a particular occupation, selecting lessons from JSEP that provide instruction for those skills, and then entering the lesson list into the Student Management System (SMS). This kind of customization can and probably will be done at most industrial sites in order to develop the occupational paths that best fit local job training needs.

  Representatives from both Ford Aerospace and Florida State agreed that many levels of customization could be done for private sector firms at various levels of cost. Customizing prescriptions, as described above, can be done at very reasonable costs. Incorporating such features as the company name and logo at the beginning of the program involves changes to the ADAPT authoring language, but is simple to do and can be done at very low cost. Detailed customizing that involves reauthoring for a single customer, such as using lesson graphics that display the company's products and text that mentions company activities inserted into individual JSEP lessons, would involve greater expense. Costs for these changes would be in direct proportion to the number of changes that were done to both text and graphics in the individual lessons.

- **Authoring.** Both Florida State and Ford Aerospace representatives felt that allowing customers of JSEP to change the content of lessons though eliminating/adding/changing examples would in essence dilute JSEP, and it might no longer get the same results, and would no longer be a comprehensive integrated product. In addition, customer effected changes to the curriculum or SMS have the potential to complicate or jeopardize the upgrade path for that user since new releases depend upon structure that the user may have altered.

  Ford and Florida State felt that this lack of quality control would be seriously detrimental to the integrity of JSEP unless each changed or newly developed lesson underwent the same rigorous review and evaluation cycles as the original materials. These cycles included internal and external design-level reviews, internal and external development-level reviews, and formative and summative evaluation of on-line materials in the field. The reviews were conducted by instructional designers, subject matter experts, and graphic designers. Evaluations, conducted by internal and third-party evaluators, required large numbers of students.

  Although many Symposium participants shared some of Florida State and Ford Aerospace's concerns on this issue, there was not unanimous agreement that multiple versions of JSEP would be untenable.

- **Maintenance, Startup Problems and Technical Assistance.** Both White Plains and Meridian encountered more problems than they had anticipated.

partly because new hardware caused software problems. It was noted that Florida State was not paid for the technical assistance which they provided to Meridian, and the group agreed that in any future demonstrations or marketing of JSEP, funds must be budgeted for technical assistance. In addition, a single point of contact (e.g. an 800 telephone number answered beyond regular business hours) would be essential. Currently a single point of contact (an 800 number) does exist for TICCIT hardware maintenance and software services, but not for JSEP specific problems.

- **Work Station Costs of JSEP.** One of the concerns of some Symposium participants was the work station costs of JSEP. Although a participant pointed out that the future benefits in terms of increased productivity and promotability, etc. far outweigh the costs, there seemed to be some agreement that lower costs of installing, operating and maintaining JSEP work stations would, if not be a precondition for, then greatly facilitate the dissemination of JSEP. Several ongoing developments that are being worked on by Ford Aerospace have the potential to somewhat lower the cost per work station. These are discussed at the end of this summary.

- **Public versus Private Sector Funding for JSEP.** There seemed to be agreement within the group that at least for the next year or two some continued federal government funding of JSEP would be necessary. There was also agreement that in the long term, for JSEP to be broadly distributed successfully, private investment would be important. However, this discussion was somewhat limited by the fact that the copyright of JSEP courseware is currently unresolved (see further discussion below). Nevertheless, some felt that public dollars should continue to be used to support JSEP regardless of how the copyright issue is resolved, because a large amount of public dollars are already allocated for basic skills programs (including Adult Education, JTPA, JOBS etc.) and JSEP could benefit these program participants.

- **Possible Sources of Funds for JSEP.** Several participants felt that coalitions should be organized to obtain public funds (e.g. NAB and NGA to provide links to both state, federal and private sector sources). Within the federal government, approaching several departments jointly -- HHS/DOE/DOL/DOA might be the next logical step.

  Three or four Symposium participants (both at the federal and state government level) thought the potential of using JOBS program funds to pay for JSEP for welfare recipients should be explored. One advantage of such an arrangement would be that JSEP facilities at the local level could serve clients funded by several different federal programs (JTPA, JOBS, Adult Education, Job Corps etc.).

- **Private Sector Distribution of JSEP.** Florida State representatives reported they have had preliminary discussions with a number of companies interested in marketing JSEP. One important criterion for selecting a vendor will be the extent to which they have addressed promotion and sales of the system.

Ford Aerospace has also had strong indications of interest in JSEP. Although JSEP has had no advertising and little publicity, Ford has received over 200 inquiries about it.

- **Copyright Issue.** Although many government contracts and grants allow private sector grantees to apply for and receive copyrights for products developed with government funds, the copyright for JSEP courseware is currently being questioned by a number of organizations, and has yet to be resolved. However, because Symposium participants were not in a position to affect the resolution of this issue, they agreed to limit discussion about the pros and cons of public versus private domain. Subsequent correspondence from The Florida State University indicates that they are currently working with the Army to develop a Cooperative Research and Development Agreement that will resolve the JSEP copyright issue and provide direction for marketing and disseminating JSEP as well as guide further development.

- **Technology Transfer.** There was some discussion about the need for technology developed by the federal government or through federal grants and contracts (e.g. JSEP) to be transferred to state and local governments. Some concern was expressed about further development and dissemination of JSEP if it is decided that it is within the public domain.

- **Finding a "champion" to carry forward the development of JSEP.** There was general agreement that at this stage JSEP needs a "champion" to insure that funds are found to:
  -- refine it so that it is more marketable
  -- develop a marketing plan and a delivery system, and
  -- support technical assistance to users.

  The DOA representative volunteered to work in this capacity for the next 3-4 months, as she has been given authority by DOA to work with funders and organizations on a transition team now that the DOA JSEP contract is over.

  Other suggestions for potential "champions" or organizations included:
  -- The White House
  -- State governments
  -- Dept. of Labor (thought by some to be most likely of federal government agencies), although a DOL representative was less optimistic, and thought that the the copyright and cost issues clouded the chances of further funding.
  -- NGA
  -- Joint HHS-EDUC-LABOR initiative -- JSEP might fit into this or JOBS.

- **Future Development of JSEP.** Florida State representatives made the following recommendations for further development of JSEP include:

  1. Fix errors based on current situation at Meridian and White Plains.
  2. Obtain other industrial input on errors based on proposed Ford Demonstration (see below).

  3. Add more on civilian survival skills (balancing check book etc.).

4. Consider adding more teaching of computer literacy -- some have recommended drill and practice in keyboarding and adding word processors to better teach writing skills.

5. Expanding sections on "learning how to learn".

Common ground must be found among industrial , continuing education and other users, and then ways to finance these developments must be found.

Florida State has also submitted a proposal to the Department of Education for funding to:

1. Continue and expand the scope of the White Plains demonstration.
2. Make changes to JSEP courseware based on findings from White Plains and Meridian demonstrations.
3. Initiate an industry demonstration at a Ford Motor Co. plant.

Ford Aerospace -- New Product Development for JSEP

On the second day of the symposium some participants attended an optional presentation at the Ford Aerospace facility in Reston, Virginia to discuss and view the new software products that Ford is developing for MicroTICCIT, the system which runs the civilian version of JSEP. These software products will make JSEP more accessible to organizations by eliminating the requirement for all proprietary hardware products from Ford that until recently were necessary for JSEP.

As noted below, these developments lower the price of a JSEP work station. However, as several symposium participants emphasized, in order to use JSEP, there will always be certain expenses including computers, large disk drives, a local area network to connect work stations to one another and the host or file server.

1. **The current 860A display board** (proprietary to Ford Aerospace) in the student work stations has been **replaced by a commercially available VGA Board**. If the pieces of the work station are purchased through Ford and assembled by Ford, this lowers the price for a work station by about $1,000 to about $5,500.

2. **Using the IBM Model PS/2 Model 50 and certain other IBM PC compatible equipment as JSEP student work stations.** Although the resolution of these displays is not as good as on a TICCIT work station and the displays are smaller, symposium participants thought the displays appeared to be acceptable. Certain additions must be made to a standard IBM PS/2 Model 50 and other compatibles to make them useful and cost effective as JSEP student work stations. The following must be added:

   - Local area network (LAN) board which connects the student work stations to a host computer or file server. This eliminates the need for a separate hard disk drive in each student work station and provides centralized student records for the instructor.

   - Light pen and light pen board or touch screen. (A mouse, which is the usual input device for these machines, may be used but Ford recommends against mice because of the difficulty many students may have in using them.)

- A laminated plastic template to convert a standard keyboard to a TICCIT student keyboard. Instead of the template, a TICCIT keyboard especially designed for easy use by students could replace the standard keyboard, and would add about $250 to the price of the work station.

This software product will be tested in beta sites at selected Ford facilities and community colleges starting in January 1990. Commercial release is scheduled no later than October 1990, although this part of the software product may be available as early as second quarter 1990.

3. **Software that can be used on many commercially available computers.** A host or file server with a large disk drive and a local area network would still be the most practical and cost effective way to run JSEP because instructors would have a single point for student data collection and only one hard disk drive would be required in the network. However, none of the hardware would have to be purchased from Ford Aerospace(although they could be -- and Ford would be willing to assemble the systems, if requested, whether or not the hardware was purchased through Ford).). The minimum that would have to be purchased from Ford would be a tape containing the delivery software and the JSEP courseware. A commercial price for this software has not yet been established but will be during first quarter 1990. Commercial release of this software product is slated for October 1990.

   The equipment used for JSEP can remain multipurpose equipment, and as such can also be used for other than JSEP applications, including word processing and spreadsheet uses, and other training applications.

CORPORATE WORKPLACE LITERACY PROFILES

This section summarizes NAB's findings from discussions with administrators of nineteen programs. The summary is followed by profiles of ten of the programs. Ten profiles, selected because they have unique or innovative aspects, are of basic skills/literacy programs sponsored by: Aetna, Hartford, CT; District 1199C Training and Upgrading Fund, Philadelphia, PA; Erol's, Springfield, VA; Florida Steel, Tampa, FL; H.J. Heinz, Pittsburgh, PA; McGraw-Hill, New York, NY; Onan Corporation, Minneapolis, MN; Planters LifeSavers, Suffolk, VA; Polaroid, Norwood, MA; and Swift Textiles, Columbus, GA (The other programs that NAB contacted were based at Hopemont State Hospital, Kingwood, WV; JPS Elastomerics, Stuart, VA; Hewlett Packard, Spokane, WA; Nabisco, Philadelphia, PA; Newport News Shipbuilding, Newport News, VA; Philadelphia Newspaper, Inc., Philadelphia, PA; Price Pfister Plumbing, Pacoima, CA; Transamerica Occidental, Los Angeles, CA; and VIz Manufacturing, Philadelphia, PA.)

Background

During the past few years, as new technology continues to be adopted by business and industry, it has become increasingly apparent that there are basic skills deficiencies among our workforce. At the same time, due to the aging of the baby boom generation, the number of entry level workers has decreased, and many of these new workers have not completed high school. In addition, older workers who started work at a time when a high school diploma was not necessary, may find themselves unqualified to fill their jobs which have incorporated new technology.

Meanwhile, as employers experience difficulties hiring qualified workers, some have decided to provide basic skills or literacy training to selected new hires or current employees. In some cases, these basic skills classes are prerequisites to technical training, but in others, improved reading, writing, mathematics and/or communication skills may be sufficient to perform jobs reconfigured to take advantage of new technology.

In order to examine this issue further, and to look at the extent that computer software is used for basic skills/literacy training, NAB conducted discussions with nineteen companies that have implemented basic skills/literacy programs. (One of the nineteen is operated by a Training and Upgrading Fund jointly administered by union and management, but for convenience the collective term "companies" is used.) Although the purpose of the discussions was not to determine if these companies would be receptive to JSEP, it was thought that learning more about the level of commitment to basic skills programs, and use of computer software toward this end, would be helpful in evaluating the potential for JSEP in the private sector.

Generally, these companies were selected because their programs had been briefly described in a published report or newsletter. Most companies were of intermediate size in terms of number of employees at that location (500 - 2,000 employees), but a few were larger -- including a company headquarters with 15,000 and a shipbuilding company with 30,000, and a few smaller -- one with under 200. The companies were not selected because they were known to have exemplary programs, although a few programs have received some publicity.

NAB usually spoke to either the person in the company who directly administers the basic skills/literacy program, or to their supervisor within the human resources or training department. For two companies, the discussion was conducted with the program administrator from the adult education department of the local school system.

In starting a literacy/basic skills program, administrators emphasized the importance of support from top management. Large companies tend to use their own training staff to provide basic skills training, or may even establish a separate training center or institute (e.g. Aetna). Smaller firms generally make arrangements with a community college, with the adult education department of the local school system, or with a nonprofit literacy group to provide the training.

Some programs use standard literacy material such as Laubach. Others are based on adult basic education curricula, or prepare students for the GED, while a few are completely customized to the needs of the company.

Much has been written about the importance of literacy/basic skills training presented in a functional context (that is, in the context of the job). Because the development of a "strict" functional context program requires a detailed task and literacy analysis, the costs may be prohibitive. However, many of the companies we spoke with reported that in developing the curriculum, instructors observe employees at work, talk with supervisors and employees about their jobs, and try to use appropriate corporate written materials in the instruction.

English as a Second Language (ESL) programs fall within the rubric of basic skills programs. Where there are a substantial number of employees for whom English is not the native language, firms generally set up a separate ESL program rather than combining it with the regular basic skills program. While most of these courses emphasize every day English living skills (e.g. dealing with bank account, car insurance, etc.), Polaroid has developed a customized ESL program to teach 240 long term temporary employees (70% of whom are illiterate in their own language) enough Math, English and technical skills to enable them to switch to computer integrated manufacturing lines.

One of the salient issues for administrators of workplace literacy/basic skills programs is how to recruit employees. Several of our contacts emphasized the importance of the program name. Employees may be embarrassed to sign up for classes labeled as literacy or basic skills. Some alternatives that we found are Effective Business Skills (Aetna), Renewal Education (Swift Textiles), and Technology Readiness (Polaroid).

There is some disagreement over recruitment methods. Some companies believe in sticking to formal non-threatening methods such as posters, newsletter articles, letters to homes, and printouts on pay stubs. One company even encouraged workers to sign up on a confidential hotline, and attend classes anonymously at a non-profit literacy center. On the other hand, others emphasize the importance of personal contact -- employee meetings, supervisor and peer recruitment, and union steward contacts.

Characteristics of Literacy Programs

The following are some of the characteristics of workplace literacy/basic skills programs that NAB found.

- **Onsite** instruction was favored by almost all companies as a way of reinforcing the importance of education to the company and increasing the convenience for employees.

- Classes conducted on **employee time or split between company and employee time** were the norm. The greater commitment on the part of the employee that this requires was cited by several as the rationale. However, retention in training tend to be higher at firms where classes are conducted entirely on company time.

- Most companies **schedule classes to maximize attendance.** For example, classes are frequently scheduled to overlap two shifts, so that employees can attend immediately before or immediately after work. Other firms have established centers offering individual tutoring on a drop in basis, that are open five or six hours several days a week. **The length of classes** varies, but two sessions weekly, each 1 and 1/2 or 2 hours, is a common practice.

- Some companies offer **fixed length courses**, (e.g. a quarter or semester). These have the advantage of making it easier to evaluate employee progress, facilitate the coordination of class sequences, and give employees the satisfaction of completing a unit. On the other hand, **open entry open exit** classes, which are also quite common, allow employees to move in and out of class if their schedule changes, promote self-paced learning and encourage reluctant employees to join the class on an ongoing basis.

- **Incentives to participate and recognition for achievement** are somewhat delicate issues. Generally, opportunities (but not promises) for promotion are considered an incentive. In some companies undergoing extensive technological changes, there is an explicit understanding that for employees lacking basic skills, there will be *no* opportunities for promotion, and that their present job may be in jeopardy unless they participate. Monetary bonuses are seldom used -- some administrators cite objections from the union, others feel it would be unfair for other employees who already have the skills. Recognition generally seems to be limited to awarding certificates, and occasionally, a special luncheon, or writeup in an internal company publication. Efforts to recognize participation also may be limited by the desire of participants to minimize publicity about their prior lack of skills.

Use of Computerized Instruction for Basic Skills

NAB asked program administrators about the use of computerized basic skills packages. Generally, computerized instruction is not used at these companies, and when it is, it tends to be for extra practice and reinforcement rather than for regular instruction. Only Heinz uses the computer for regular instruction. It uses basic skills software on the PLATO system. Heinz is also looking into IBM infowindow technology and video disks.

Five of the nineteen programs make some use of computer software for reinforcement. Three companies, Hewlett-Packard, Aetna and Transamerica

Occidental offer separate computer literacy classes. Several companies expressed interest in obtaining computerized basic skills programs, and a few have already made plans to do so.

The primary deterrent to using computerized software seems to be the expense. This was mentioned as a deterrent by three firms. Others mentioned the difficulty to arrange for time on computer terminals that are already in house. One administrator noted that human interaction is needed -- especially at the lower levels.

Recommendations for Companies Wanting to Start a Basic Skills Program

In addition to discussing the characteristics of their literacy/basic skills programs, NAB asked program administrators what recommendations they had for other companies wishing to start a program. Some of their suggestions are:

- "Curriculum must be designed to meet the needs of supervisors as well as employees." (Gloria Asher, Erol's)
- "Program must be offered as a positive opportunity -- not as a solution to an individual's problems." (Janet Brinkley, Planters LifeSavers Co.)
- "Insure that managers and supervisors are supportive from the start -- and that they will allow students to attend." (Janet Brinkley, Planters LifeSavers Co.)
- "It is a terrific benefit -- people feel very loyal to the organization if it invests in their education." (Joyce Lincoln, Hewlett Packard)
- "CEO must endorse. Otherwise it won't work." (Edward Brayboy, Newport News Shipbuilding)
- "Teachers must be handpicked -- and have experience with and be able to establish a rapport with low level *adults* " (Edward Brayboy, Newport News Shipbuilding)
- "It is important that an educator (not a trainer) is on the payroll, or is hired as a consultant." (Chuck Fessenden, Swift Textiles)
- "Talk to others who have done it. Do a needs assessment first. Use functional context as much as possible -- it is very important, and the classes that incorporate the most job related examples are the best classes." (Linda Lindsey, Onan Corporation)

The Programs

Profiles of ten of the programs which NAB contacted are presented here. These firms were selected because of an unique or innovative aspect of their literacy/basic skills programs.

- The **Heinz** plant in Pittsburgh was selected because the basic skills program is unusual for a plant this size (about 1,000 employees), in that it includes a computerized training package, and is closely linked to skills courses.

- The program at **Swift Textiles** is unusual in that it is one of the very few programs that are not offered onsite, and also in the high proportion (about one-third) of employees who participate at any one time.

- **Aetna** stands out because it sponsors several different basic skills courses for employees, and also has a program for disadvantaged adults from the community.

- **District 1199C Training and Upgrading Fund** is an example of a strong program that is jointly administered by union and management, and includes a pre-allied health course that prepares participants for nursing training.

- The program at **Planters LifeSavers** has a substantial proportion (20%) of non-readers, because many workers started when manual labor was predominant, and basic reading skills were not required. The program was requested by the union in 1978, and offers "walk-in" instruction at three reading skills level.

- **Polaroid's** Technology Readiness Program was initiated in 1985 to prepare employees to keep up with changing production techniques. It is unusual in the range of courses that offered -- such as communication, critical thinking, and technology as well as more traditional basic skills courses

- **Erol's** has operated an award winning English as a Second Language Program.

- **Florida Steel** operates a program in a Knoxville, TN plant it bought where it found 90 of 300 employees to be functionally illiterate.

- **McGraw-Hill** offers a Corporate Social Responsibility Program for physically handicapped or economically disadvantaged people, as well as general basic skills courses, and courses in editing and proofreading for its own staff.

- **Onan Corporation** has an unusual incentive to promote attendance and completion of its basic skills courses -- participants with too many absences must pay back the company for the cost of the course.

H. J. Heinz Company (Pittsburgh, Pennsylvania)

Larry Ruffner, Personnel Manager for Heinz's Pittsburgh plant, advises other companies thinking of setting up a basic skills/literacy program "Don't reinvent the wheel -- use the resources that are already in your community." At his Heinz plant,

which makes soup, baby food, and ketchup pouches for fast food outlets,the literacy program is operated in cooperation with the non-profit Pittsburgh Literacy Initiative. The program is unusual for a plant this size (about 1,000 employees), in that it includes a computerized training component, and is closely linked to skills courses.

The Pittsburgh plant is the original Heinz plant, and is over 100 years old. The factory has become quite outmoded, although they have undergone a gradual automation process over the past 10 years. Nevertheless there are many different buildings, and the production process moves from floor to floor, as opposed to being on an efficient, modern, horizontal setup To ameliorate this situation, the Board recently approved a $90 million restructuring which will result in 70% of the equipment being replaced (the remainder is relatively new), and the consolidation of all plant operations into one new building.

About 3 years ago, plant management realized that some employees did not have the basic skills to operate new equipment, which frequently requires using a computer keyboard. They decided to start a basic skills program and also a skills program for maintenance workers which uses the PLATO computer system. Classes started in September 1987.

The Heinz program is operated in cooperation with the Pittsburgh Literacy Initiative which offers very basic literacy classes which meet for 2 hours twice a week, onsite, but on employee time. These classes target employees with skills below the 5th grade level. Employees with skills at the 5th to 6th grade level participate in PLATO basic skills courses, generally for one 2 hour period weekly, scheduled individually, on an employee's own time. Employees testing at 9th grade or above are referred to GED programs where they receive 100% tuition reimbursement if successful.

The PLATO skills training for maintenance workers includes pretests which refer workers to algebra or other PLATO basic skills courses as needed. For this skills training, the time is split between employees and the company, as negotiated through the union contract.

Students are recruited through posted notices, a videotape presented on the company internal communications system, supervisor referrals, and personal contacts made by the Employee Development department. Larry Ruffner notes "We are planning a second identification process and hope to involve the union more -- at the steward level, and also through labor-management committees such as safety and quality control."

Pittsburgh Literacy Initiative administered an assessment test the approximately 60 employees who signed up, and lacked basic skills. Of these sixty, nine were found to have extremely low reading skills and were assigned to the class with the Initiative instructor. The intermediate group, who read at the 5-6th grade level consisted of 40 -50 workers, and was assigned to the PLATO basic skills training. About 10, who were at the 9th grade level, were referred to GED programs.

The basic skills courses are not currently being taught in a functional context, but discussions are being held with Pittsburgh Literacy Initiative about incorporating plant terminology, recipes, etc.

Larry Ruffner notes "PLATO insures that students master a level before they can move on. However, student achievement can be seen from their success in new, challenging jobs." In the very basic literacy class eight of the nine students stayed

with the class for a second year. Success is rewarded with certificates, dictionaries for students in the very basic skills class, and an awards ceremony. There is also potential for promotion, particularly for those at the lowest levels.

Contact: Larry Ruffner
H. J. Heinz Company
Personnel Manager, Pittsburgh plant
P.O. Box 57
Pittsburgh, PA 15230
(412) 237-5077

Swift Textiles (Columbus, Georgia)

"Improvements in self-esteem and self-worth of the employee participants" is the greatest success of Swift Textiles' Renewal Education program, according to Chuck Fessenden, Education Coordinator. Swift's program opened in October 1987 as a result of a planned upgrading. It is unusual in that it is one of the very few programs (of those NAB examined) that are not offered onsite, and also in the high proportion (about one-third) of employees who participate at any one time.

Swift Textiles operates two plants in Columbus, with a total of 1,125 employees. These plants, which have been in operation for more than 100 years, make cotton into thread, and weave it into denim. In spring 1987, a $52 million upgrading and expansion was announced -- to initiate computerized looms and packaging.

As a result, a three way partnership was established between Swift, Columbus Technical Institute (a proprietary vocational school), and the adult education department of the local school system. Renewal Education, as the program is called, offers basic education, GED, and an associate degree in business. At any one time almost 400 employees are enrolled.

Chuck Fessenden explains, "The program is not offered onsite, but at Columbus Technical College, halfway between the two plants. We wanted a distinction between work and school. Also, since employees work 12 hour shifts, they attend school on their day off, so there is no advantage to offering classes onsite."

The Renewal Education center is open mornings four days weekly, and two evenings a week. A formal class is taught for those who can barely read, but the others work individually with assistance from instructors as needed. Employees are urged to come in three hours a week, and receive a certificate for every 75 hours of participation (six months at 3 hours weekly). Spouses are welcome to attend, and high school aged children may come in for tutoring assistance. Although participants do not formally schedule a time to come in, they generally come in the same time each week, and if they are not there, Chuck Fessenden will call them to follow up.

To recruit students meetings of 15-20 employees were held. The upgrading and expansion were announced, and employees were told that it would be difficult to progress without basic skills. There was an implied message that without improved skills, their jobs might be threatened. Cards were distributed to sign up. More recently, cards have been filled out in advance to assist those who cannot write, and workers are shown the place to check if they wish to participate.

Renewal education uses company manuals to assess reading skills, and there is an emphasis on the type of math that is used in the textile business -- fractions, percentages, and converting English to the metric system. The adult education teachers provide materials which are supplemented by Laubach literacy materials bought by the company. Swift is also buying an IBM networking system, and academic software.

Swift found 52 employees who tested below the 4th grade level; about 375 did not have a GED or high school diploma. One hundred twenty-six employees took the standardized adult basic education test (TABE) soon after they started the program, and then again 15 months later. During that period the average increase for math was 2 years, for reading, a little less than 2 years, but for language there was very little improvement. (Chuck Fessenden attributes this largely to the use of independent study and limited exposure to the speech of instructors.)

All 16 students who have taken the GED have passed it. Thirty-eight students are in the community college program, including some who received a GED through the renewal education program. As an added incentive to work toward the GED, starting in January 1989, all new employees without a high school diploma or GED, must sign an agreement that they will work toward it. They may keep their jobs without passing it, but they must go to classes.

If he started the program again, Chuck Fessenden would try to make it more like school and less voluntary. Nearly everyone skips the week they work seven days (once every two months), but also tends to skip the week they are off (also once every two months) because it feels like vacation.

Asked for advice to other companies, Chuck Fessenden emphasizes that the CEO must be willing to commit time and financial support toward the program, the importance of hiring an educator (as opposed to a trainer), and the importance of working with line supervisors because they know what skills are lacking, and can see changes and improvements.

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Aetna: Aetna Institute for Corporate Education (Hartford, Connecticut)

Aetna's basic skills education programs have allowed "individuals who previously did not have the opportunity, to take it, be successful and do a lot with it. Some have been promoted; many have increased their productivity." (Ira Mozille, Senior Education Advisor). Aetna stands out because of sponsorship of a six to eight week training program for disadvantaged adults, and and a basic skills program for employees which includes several different courses.

Aetna, a leader in the insurance business, and expanding into the area of financial services, has about 15,000 employees at its Hartford corporate headquarters. The

Aetna Institute for Corporate Education is directly across the street from headquarters, and fulfills a wide range of education and training needs.

In 1981, Aetna, in partnership with the National Puerto Rican Forum established the Office Futures program for disadvantaged adults. Students, who as a prerequisite must attain sixth grade levels on a basic skills test, study business English and math, typing and other office skill for five months, complete a two week internship, and must increase their test scores to the ninth grade level in order to graduate. The program has a 90 percent placement rate.

More recently, in January 1988, in response to changing job demands at the company, the Institute initiated The Effective Business Skills School for it employees. Basic skills are taught in five curriculum areas: Learning to Learn; Oral and Written Communication; Mathematics; Computers; and, Analytical Skills. Daytime courses, which are taught on company time, focus on skill development to meet current productivity needs while evening classes, held on employee time, focus on skill development to meet long term employability needs.

The courses within the Effective Business Skills School vary in length, but frequently meet for a three hour session for 10 weeks. For some workshops there is a choice between all day sessions for one to to three days or three hour sessions spread over a number of weeks.

There are also tutorials in reading (literacy), English as a Second Language, language skills/writing, and math. Students meet with Aetna volunteer tutors for one-on-one sessions for two hours weekly to work on meeting predetermined learning objectives.

Employees are recruited through a newsletter and through outreach efforts with supervisors. Supervisors are given course catalogues and encouraged to talk to employees, or refer them to the Institute.

To develop skills within a functional context, instructors do an assessment at the beginning of each class. Says Ira Mozille, "Based on the needs of the individual students, the instructor will select appropriate contextual material."

Students must demonstrate proficiency to obtain a certificate of completion. Case studies and demonstrations are used rather than tests. The retention rate for the day program is 95% or higher. It is about 65% for the evening program.

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District 1199C Training and Upgrading Fund (Philadelphia, Pennsylvania)

"District 1199C's Training and Upgrading Fund was started in 1974 to increase promotional opportunities for health workers," explains Director James Ryan. It supports many skills training courses, as well as basic skills. The Fund is jointly administered by union and management, and is funded by management

contributions equal to 1% of salaries, as well as additional public and private funds. As of 1989 40 employers belong to the Fund.

The Fund hires staff directly to teach the basic skills courses. These are generally offered at a central location operated by the Fund. Some classes are offered at the worksite, but these are generally not as popular. "Probably because there is much less anonymity in the workplace", speculates James Ryan. Company contributions to the Fund support the classes, but companies do not pay for student materials directly.

Basic skills classes are usually held twice a week, with each class meeting 2 1/2 to 3 hours. Classes are generally held between 4-8 p.m. and 9-12 a.m. to accommodate workers from different shifts. Employees attend class on their own time.

Most basic skills classes are open entry open exit. However, there are two special pre-allied health classes that prepare students to go on to nursing programs or other health worker degree programs (and also include GED preparation). The full time program runs for 17 weeks; the part time for 52 weeks.

Recruitment for virtually all students results from employees taking the entrance test for a technical skills course and being told that they do not qualify unless they take basic skills first.

Most of the basic skills training is preparation for technical training that will prepare for future upgrades (e.g. certification in technical skills for nursing home work). They are in the process of developing a program which combines basic and technical skills for nursing home aides. This program, and the 17 and 52 week pre-allied health curriculums are taught in the functional context. For the other basic skills courses, this is much more limited.

The Fund judges program success primarily through the satisfaction of students. James Ryan notes "It is hard to evaluate the basic skills courses because most of them are open entry open exit, so one doesn't have a time frame to calculate retention rates. The same goes for measuring achievement We give pre-- and post tests but because of the open entry open exit system people drop out and then come back which makes the tests results hard to interpret". However, they do have classroom monitors who go around evaluating teachers. They are trying to improve this process by insuring that a standardized check list is used.

Receipt of GEDs is not used as a measure of success, because most employees are not interested in a GED -- they take the courses to prepare for technical skills training. In addition, many participants have high school diploma already.

The Training and Upgrading Fund hold a graduation ceremony for students completing Fund programs. According to James Ryan, "It is a very big deal!"

According to James Ryan, the most successful part of their program is the existence of the Fund itself. "Heath care is no longer a dead end job -- there is a career ladder, and it is possible to progress from, for example, a nursing home aide to a registered nurse."

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Planters LifeSavers Company (Suffolk, VA)

Says Janet Brinkley, Director of Employee Training at Planters, "The basic skills program was established in 1978, and recently we've had about 50 employees participate at some time during the year".

Planters LifeSavers Company, which produces Planters peanuts, Life Savers candy and other snacks and confections products at six manufacturing sites, was founded in 1906. The almost 900 full time employees at the Suffolk plant produce oil roasted peanuts. The manufacturing processes are updated frequently, which requires reading changes in the manual.

The impetus for a basic skills program came from the union. In 1978, at first the union thought an apprenticeship program was needed, but then decided that the major problem was inadequate basic skills. As a result of subsequent negotiations, the company contacted the adult education department of the city school system for assistance in establishing a program.

Planters Employee Training is a cooperative arrangement funded 65% by Planters and 35% by the school district. The program staff is employed by the Suffolk school system. The director, Janet Brinkley reports both to the company personnel manager and to the school system. In addition, she keeps the union informed.

The training is provided onsite in a classroom in a well-travelled area, next to the cafeteria. There are three teachers to whom students are assigned based on their reading skill (grades 0-3, 4-7 and 8-GED). The classroom is staffed from 1-6 p.m., Monday through Wednesday. Employees may come in anytime during that period, on their own time, but are expected to attend for a minimum of four hours weekly. The program runs from September to May, but is open entry open exit. Classes are not offered during the summer because many long term employees take extended summer vacations.

Adult basic education (2 levels) and GED preparation are taught. The teachers use company manuals in their teaching, and pay particular attention to manuals for new machines. They also obtain information from bulletin boards (on departmental changes etc.) which may be useful in generating class material. Generally the teaching is in the overall context of the business. However, at a supervisor's request, teachers sometimes work with an employee on specific job-related tasks.

Janet Brinkley notes that it is difficult to determine how many employees have high school educations or are functionally illiterate. But she points out, "When many of the older workers started, most of what they were doing was manual labor, and basic reading skills were not required."

Recruitment is done through word of mouth and peer encouragement. Flyers are attached to bulletin boards to be taken, and are distributed by the union. In

addition,the teachers hold open houses in the classroom, with books and materials displayed. Since the classroom is next to the cafeteria, this generates a lot of traffic.

During the 1988-89 year, 53 employees were involved in the program at some point. About 10 were virtually nonreaders. About twelve read at the 4th-7th grade level and 26 were in GED preparation classes. Of these 26, 8 already had a high school diploma, but realized that they were lacking in certain areas -- such as math-- and found they could not handle the computer work needed for their jobs. Thirty-four students stayed with the program for the whole year.

Says Janet Brinkley, "Achievement varies, and is hard to measure, but at the middle grade levels increases in one year may be four or more grade levels". The Test of Adult Basic Education (TABE), which may be used starting with the 2nd grade level, is administered.

In terms of recognition for participation, there is a closing ceremony with certificates and awards. It is designed so that all participants receive an award for their achievements.

Janet Brinkley emphasizes the importance of offering the program to all employees, not only those who cannot read and of offering it as a positive opportunity for growth rather than highlighting one's lack of skills. "Also, it's very important that managers and supervisors are supportive from the beginning."

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Polaroid (Norwood, Massachusetts)

Planning for Polaroid's Technology Readiness Program began in 1983. "We chose the name", explains Program Director, Acquanetta Farrell, "because we wanted to emphasize the positive idea of keeping up with technological change, and disassociate the program from the remedial education concept".

Polaroid has about 10,000 employees, most of whom work within a 60 mile radius of Boston, near Route 128. The company was founded in the early 1950's, and frequently undergoes production changes. In 1983, there were changes in the chemicals used to produce film, the way cameras and batteries were being made was also changing rapidly, and sales were slow. Although Polaroid has almost always had some kind of basic skills program, at this point it was thought that something more comprehensive would be needed so that they could retrain rather than layoff employees. After completing a needs analysis, Polaroid decided to initiate an enterprising basic skills training program.

To implement the program, Polaroid contracted with the Workplace Literacy Consulting Forum, which currently has 10 people working for Polaroid from 25-40 hours per week. This group administers the program, and teaches the courses. The

Forum also has other corporate clients, but Polaroid's program is the only one where they teach the students as well as training instructors.

The Technology Readiness Program, which started in 1985, includes a wide range of courses on communication, critical thinking, literacy, algebra and other math courses, science, technology, writing, and English as a Second Language. Although many courses are at the high school level, they go through the second year of college.

Courses at the basic education level (below 8th grade) emphasize problem solving, team orientation, working with a culturally diverse workforce, and using the reading/math/science content knowledge on the job. At the high school level, 7-10 reading/writing courses, 7-10 math courses, and 8 science courses are offered. Referrals are made for GED preparation.

The Technology Readiness Program is set up to allow workers from all shifts to participate in the classes, which run twice a week for 1 and 1/2 or 2 hours for 12 week sessions. The courses are all offered onsite, and 90% are on company time. All courses are taught in a functional context. "This is a major motivating factor." says Acquanetta Farrell.

Polaroid pays for materials and textbooks for the students to use. If students want to obtain a textbook to keep they may buy one through payroll deduction or from the company store.

Polaroid takes a personal approach to employee recruitment for this training program. Supervisors are involved based on their knowledge of a department's and an employee's needs. Peer recruitment is also encouraged -- students who have taken a course are recruited to market it to others, and resource specialists meet with groups of employees. A course catalogue is produced three times a year.

Customized training is also done, at the request of a specific division. This includes a task analysis, with emphasis in observing and talking to line employees. Then a course is developed tailored to their needs.

In addition, customized English as a Second Language (ESL) courses have been taught. For example, the hardware apprentice program started in April 1989. This course is for 240 long term (3-5 years) temporary employees who must be retrained because their manufacturing lines are becoming computer integrated. The native languages of these employees include Portuguese, Cape Verdean, Haitian and Italian; assessments indicate that 70% are illiterate in their own language. They have been told that in order to keep their jobs they will have to study ESL and Math for at least a year. After six weeks participation, their supervisors report that they have started meeting their quotas for the first time.

At Polaroid, computerized basic skills software is available, but is used only on a limited basis, particularly at the lower levels. Acquanetta Farrell notes "Human interaction is important -- especially since we are teaching how to work as a team." Some courseware is used to reinforce what is taught in a classroom setting.

Evaluations of the Technology Readiness courses, instructors, content, etc. are completed by the students. Student assessments and test results are maintained in a data base. Teacher evaluations of student achievement are given to students, and will be placed in personnel files, if requested by students. So as to examine if students

apply what they learn, supervisors are interviewed. Validity studies have been initiated, but these are long term and it is too early for results.

At any one time about 2,000 employees participate in some part of the Technology Readiness Program. The retention rate for individual courses in 75%-80%. Most who dropout do so because their work is overwhelming them. Most Polaroid employees work overtime, and 12 hour days are not uncommon. Students may reenter a course the next time around.

Employees receive certificates for course completion, which they usually like to have placed in their personnel files. Course completion is not linked to promotion.

According to Acquanetta Farrell, one of the successes of the Technology Readiness Program has been that "the company has redesigned the structure of working -- teams are used much more, and they are putting a lot of effort into training people to work on teams." To other companies wanting to start a program, she says "You should do it if you want to stay competitive. If you want to affect the bottom line, you have no choice."

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Erol's (Springfield, VA headquarters)

"Erol Onaran, Erol's owner came to the United States from Turkey with nothing and became a millionaire. He hires many foreigners, and started the English as a Second Language (ESL) program to give them the same opportunities that he had," explains Gloria Asher, Training and Employee Development Manager.

Erol's was originally started as a chain of hardware stores, but in 1981 the first video clubs opened, and today Erol's primarily rents and sells videos, although there are still some hardware stores. There are approximately 500 employees at the Springfield, VA headquarters. This include a substantial number of recent immigrants from Vietnam, as well as from Europe and Latin America. It was with these employees in mind that an ESL program was started in 1983.

Erol's ran the program directly, hiring instructors as regular company employees, and paying for all materials. Classes were offered onsite, and generally met for an hour twice a week. Employees took the classes on their own time, but during the work day, and made up for the time missed by working late. Three or four sessions were held each year.

ESL students were recruited through the company newsletter and posters. The ESL supervisor also worked closely with supervisors in outreach efforts. Over 135 employees took the course from mid-1983 to when it was discontinued in early 1989.

The content of the ESL course centered on life and job skills. First, they were taught about necessities such as money, transportation. Then they were taught telephone

skills, how to read and write memos, complete company forms, and other job related skills. In the course of developing the curriculum, the instructors met with supervisors to determine the most important skills that needed to be developed. Citizenship preparation is also given. American employees volunteer to work the foreigners on an individual basis to prepare for the citizenship test. Over 45 employees have been naturalized.

Most of the ESL training was in a general functional context, although if there was a supervisor request, some training was directed toward a specific job. For example, some training was geared toward data processing, and another sessions toward telephone answering techniques -- which included taping student telephone conversations as a teaching tool.

The major incentive for taking ESL is probably that it opened up opportunities for promotion. Students were recognized at an awards ceremony where awards were given for 100% attendance, good grades, etc. Erol's has also sponsored cross cultural programs, where American and foreign employees share information about their countries, and luncheons where workers bring in a native dish.

Overall the program was judged a success because the students gained a lot of mobility, and were promoted to less menial jobs. Individual achievement was monitored through tests given during the program, and exams after each quarter. Supervisors were also asked for feedback. About 50% of the students stayed with the course. Gloria Asher notes that there are many stresses outside work which may make it difficult to stay late to make up for class time. Some left to learn English from other sources.

Erol's ESL program received an award from the American Society for Training and Development (ASTD) in 1986. In addition, Erol Onaran has received an award from the Washington Area Teachers of English to Speakers of Other Languages Association.

Erol's recently discontinued the program because fewer students were signing up, and supervisors were reluctant to let them participate. Not all employees would make up the class time, and those that did sometimes made it up on another day -- so a supervisor might end up being short an employee for part of a busy day, and gain unneeded assistance on a slow day.

Gloria Asher advises other companies, "For ESL, the interaction between supervisors, program staff and teachers is very important. The curriculum should be geared to the needs of the supervisors as well as employees".

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Florida Steel (Knoxville, Tennessee plant)

Florida Steel has a total of 6-10,000 employees and has been in operation for about 40 years. The manufacturing process changes every year due to technological changes.

"When Florida Steel bought a new plant in Knoxville, TN, we discovered that 90 of the 300 employees were functionally illiterate", explains Skills Training Manager, Steve Graham. Thirty of these individuals were about to retire, but Florida Steel decided to implement a basic skills training program to assist the others. Steve Graham notes that "Of these 60, 10 had received high school diplomas, but were nevertheless illiterate.

The resulting adult education program started at the Knoxville plant during summer 1987. Florida Steel also has programs at four other plants, but on a smaller scale (generally the company requires high school equivalency for employment). The Knoxville program is run by the company but hires adult education teachers affiliated with the Knox County Board of Education, and pays them at an hourly rate. The School Board provides Laubach Literacy materials, and the company pays for any other materials requested by the teachers.

Two classes are offered, each meeting three hours once a week in the late afternoon, a time period that overlaps first and second shifts. One class is geared towards those below the eighth grade level, and the other for those above (including GED preparation). However, this difference is not publicized to employees; teachers direct them to the other class if they appear to be at the wrong level. This process, along with the decisions to call the classes adult education instead of literacy, is to help participants avoid the stigma of being in the lower level class.

The classes may be entered or left at any time. In addition to regulars, some employees drop in for help with a specific problem. Classes are held on company time when they fall during an employee's shift (shift and days off rotate), but participants are expected to come in if it is not on their shift or if it is on their day off.

The adult education teachers use company manuals and incorporate job-related examples in their teaching. The classes are taught in a general functional context rather than being directed toward specific jobs. Computerized training is not used. Says Steve Graham, "It did not work out well for technical skills training -- it is difficult to reserve enough computers for a class, and employees cannot keep to a commitment if something comes up with their jobs."

Recruitment of students at Florida Steel was done on an individual basis. The training manager spoke to them individually, explaining that Florida Steel was a new company which had concerns for safety that made it a priority for all employees to be able to read signs and manuals. They were offered adult education classes, and told that although the program was voluntary, if they chose not to participate they would probably not have any chances for promotion.

Fifteen employees signed up for the program initially. In June 1989, of these original 15, 8 had basically left -- 2 received a GED, 4 dropped out, and 2 came once in awhile. Meanwhile others signed up, including some who would have nothing to do with the classes initially, bringing the number of participants in June 1989 to 19.

Success can be measured informally through observation of vast improvements on the jobs. Forms can be completed and memos read. And, says Steve Graham, "students express their gratitude --I hear such comments as "Now I can read the TV guide!".

The present recognition system is limited to certificates, although the division manager took the men receiving GEDs out to dinner with their wives. In addition,

Steve Graham is considering implementing an incentive system where employees would receive a point for completing each 3 hour class. When they had received 50 points they would receive a $100 savings bond.

Says Steve Graham: "The two most successful aspects of our program are that you can see the difference in the workplace -- it has made a difference and is worth the cost, and that it builds the self-esteem of participants." If he started over, he would include work-related materials at the beginning, and implement some sort of incentive system up front.

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McGraw-Hill (New York, NY)

"I'm most proud of our Corporate Social Responsibility course for disadvantaged individuals who have not had the opportunities of our employees" says Libert Diaforli, who has directed this course since it started in 1968.

McGraw-Hill, the publishing and communications firm, has about 3,000 employees in its New York City headquarters. It celebrates its 100th anniversary in 1989, and has been implementing gradual changes over time to keep up with the latest technology.

The basic skills program, which has two components, started in 1968. One component provides various levels of continuing education to people within the company. The other is the Corporate Social Responsibility program which offers training to physically handicapped or economically disadvantaged people. The participants receive a stipend for transportation and lunch, as well as free training.

McGraw-Hill operates both programs itself, hires staff to teach the courses directly, and pays for all materials. All classes are held onsite. Students are identified and referred to the Corporate Social Responsibility classes by various nonprofit agencies such as the Urban League. To recruit employees to the continuing education classes, McGraw-Hill distributes to all employees a brochure which includes a course catalogue and comes out three times a year.

The Corporate Social Responsibility classes run for 6 or 8 weeks for 30 hours per week. There are four cycles per year, and classes are kept small -- 12 students. These classes provide intensive training in clerical skills -- recordkeeping, communication, business math, grammar, spelling, etc.

The continuing education classes, which are offered on company time, vary in format and structure. Some may meet for an hour twice a week for several weeks, while others might be a workshop that meets all day for a day or two. In addition to reading, writing and math courses, other courses offered include editing and proofreading. Classes are taught in the general functional context of the publishing business, but not in the context of specific jobs.

Separate English as a Second Language classes are offered to employees and to individuals outside the company.

Computerized software is used only on a limited basis. A few packages are used to supplement the reading courses, and individuals use them for extra practice. There are no plans to expand the use of computerized software.

The program has been successful. "The Corporate Social Responsibility program retains and places in jobs 92% of the students", says Libert Diaforli. "Of these, 50-60% are placed with McGraw-Hill". Transcripts are maintained to monitor achievement over time. Success is acknowledged in a graduation ceremony.

Company wide (16,000 -18,000 in company worldwide), over 4,000 employees participated in continuing education during 1988. This was an increase of 1,000 over 1987. Some departments offer incentives for employees to participate in continuing education, but there is no company policy. Likewise, recognition of employees completing courses is also up to individual departments.

Libert Diaforli emphasizes the importance of making changes as you go along, modifying curriculum as needed. He is a strong advocate of company administered onsite training since it is more economical and allows training to be customized to a company's needs. "We are unique among Fortune 500 companies in having a Corporate Social Responsibility program. It takes a lot of commitment, and some companies quit after trying it for a year, but I'd like to see more of it."

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Onan Corporation (Minneapolis, Minnesota)

Onan Corporation started a basic skills program in 1983 because "we needed to train employees for new jobs and realized some of them needed basic skills before they could be trained in job related technical skills" says Linda Lindsey, Manager of Training and Development.

Onan has been in operation since 1923, and has about 2,000 employees in Minneapolis. They make generator sets and engines that are used in recreational vehicles and boats, and also emergency power generators. Recently Onan has increased the level of automation, and are using robotics to assist production.

Onan runs the basic skills program, although most of the instructors are hired from outside the company . These instructors come primarily from the adult education department of the school system, and also from a vocational technical school.

All classes are offered onsite, and generally run for 16 week sessions. The employee and instructor are encouraged to use the first two weeks to see if the course is the right level, and if not, the employee drops out at that time. Usually classes are given once a week for two hours. They are offered twice, in the early and the late afternoon so as to accommodate workers from all shifts.

The company pays for all materials and expenses. However, the basic education and basic technical skills courses are given on employee time. Higher level technical course are on company time.

The number of employees who could benefit from basic skills is not as high as at some companies -- partly because the high school graduation rate in Minnesota is over 90%. Linda Lindsey estimates that only about 5% of employees do not have either a diploma or a GED. She adds "I do think there are a few employees who cannot read or write. But, the level of the students in the basic reading class varies." However, individual employees are not specifically targeted. The courses are promoted generally, although supervisors may encourage their subordinates to participate.

Recruitment is done through a letter and course catalogue that is sent with paychecks. Within each unit, employee relations staff talk to employees about the benefits of the courses. The two week "tryout' period mentioned above is also used as a recruitment tool.

Courses offered include adult basic education (reading, writing, math etc.) and basic education and basic technical skills courses that are geared towards opening opportunities for promotion, and to enabling employees to keep jobs changed by technology. Because there has been little interest in GED preparation recently, employees are referred to a nearby adult education class. Another unusual offering is sign language.

The basic education skills courses use functional context examples a much as possible. The instructors meet with supervisors, talk to employees, and get a tour of the plant, to assist them in developing this material. Because of the nature of the work, it is easier to incorporate these kings of examples in math courses than in reading courses.

The basic technical skills courses are related to general skills that open opportunities for various jobs. Examples are blueprint reading and basic electricity. The higher level technical skills courses, taken on company time, are customized toward specific jobs.

Computerized training is not used extensively. Onan has a course which is used a little for tutorials in math and reading. They are considering buying more tutorials, but are not sure the expense of a laser interactive system could be justified.

Program success is assessed primarily through an analysis of supervisor ratings. In the past, pretests allowed them to measure achievement, but these were eliminated several years ago because they discouraged enrollment. However, fewer than 10% of participants fail the tests given as part of the courses. Originally, all participants automatically passed the course, but now there is a pass/fail system for lower level courses, and a grade system for the higher level technical skills courses. An unusual incentive to promote attendance and completion is that a student with too many absences must pay back the company for the cost of the course.

The number of students taking the courses each session has been on the low side. But over the course of the entire program, many employees have participated. Reading classes are usually about five students -- partly because employees are embarrassed to admit they cannot read. Initially 10-15 signed up for math courses, but now that most employees have passed the basic level, it is generally 5-10. The basic technical

skills courses have 10-15 participants, depending on the course -- new courses tend to be most popular.

Employees completing courses receive certificates, their supervisors are informed of their grades, and a gathering is held. For those completing higher level skills training, promotion opportunities are likely to open up, but are not guaranteed. For those at lower levels, it is frequently more a matter of updating skills to keep up with changes on the job, in order to avoid layoff.

Says Linda Lindsey, "Some of the reasons Onan's program is successful are that we survey employees and supervisors after each class, and that we frequently initiate new classes based on employee and supervisor suggestions. It's also important to be on site, and to minimize pretesting." To other companies wishing to start a program, she recommends that an assessment of needs be done first, that other companies with experience are asked for advice, and "use functional context as much as possible -- it is very important, and the classes that incorporate the most job related examples are the best classes."

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Summary

Although these programs were selected because they are unique or innovative in certain ways, in other ways their basic skills programs are representative of the others NAB examined. Generally, although some effort is made to relate the program to job content (e.g. through observation of workers, meetings with supervisors, and use of company manuals), formal job analysis is not done. There are differences in methods of recruiting employees, with some companies using a personalized approach, and others relying on formal methods such as posters and letters to employees' homes.

Courses are more likely to be taught on employee time than company time. Several companies have set up centers that are open on a walk-in basis, while others have more formal classes that commonly meet twice a week for 1 1/2 to 2 hours.

Only one of the nineteen firms uses computerized courseware for regular instruction, while a few others use it on a limited basis to provide "extra practice". Although there is some interest in using computer software in the future, the expense seems to be is a major concern; the importance of human interaction -- particularly at the lower levels was also mentioned.

Although firms seem to be reluctant to pay employees for their time studying basic skills, there is overwhelming consensus that basic skills/literacy programs are worthwhile and should be adopted by other companies. While program administrators frequently mentioned that a major success is increased self-esteem of participants, Acquanetta Farrell, director of Polaroid's Technology Readiness Program, advises other companies that, "You should start a program if you want to stay competitive. If you want to affect the bottom line, you really have no choice."

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APPENDIX

The following was written by Dr. Robert K. Branson of Florida State University (FSU) and Dr. Lois Wilson of Ford Aerospace (Ford) respectively, it includes an overview of JSEP and the current and future plans of FSU and Ford for JSEP as well as recommendations from FSU. Working in cooperation with the Department of Army, FSU has the primary responsibility for courseware development and Ford has the primary resopnsibility for the hardware and software.

Florida State University

The Job Skills Education Program (JSEP) is a computer-based, functional basic skills, curriculum that is intended to be used prior to technical or on-the-job training in industry, vocational education, JTPA programs, and other settings, where trainees lack the basic academic skills to profit form training. The JSEP has gone through extensive developmental testing in industrial and job training programs.

The Civilian JSEP System.

At present, the civilian version of the JSEP includes the following components:

1) 167 lesson titles. 142 are computer-based. Most titles are represented by two lessons, a Diagnostic Review Lesson (DRL) and a more comprehensive Skill Development Lesson (SDL). Each lesson has an appropriate post test.

2) Five Learner Strategy (LS) modules. In contrast to DRLs and SDLs, that address specific academic competencies, the LS modules are designed to teach students to be better learners.

3) The Student Management System (SMS), which manages student access to--and progress through--lessons and tests, collects and stores student demographic and performance data, and prepares reports for the JSEP Instructor.

4) The JSEP Common Test, currently a 65-item criterion referenced instrument that addresses 47 skills from the curriculum. This test is a greatly shortened and degreened version of an earlier instrument developed for use with soldiers in JSEP. This test is being used for the first time in the White Plains pilot test.

5) Supplemental instruments for assessing student attitudes regarding JSEP and the computer experience, as well as student reactions to particular lessons. These instruments were devised for use during the pilot test and must be revised for regular JSEP users.

6) JSEP Implementation Handbook. This document is the backbone of the JSEP Dissemination Plan. It has been bound separately and is designed to be used as a training and reference text by JSEP instructors. Extensive appendices provide instructors with helpful information and useful instruments.

The Florida State University contract with the U. S. Department of Education sought to answer two basic questions:

1) Does the JSEP, developed for use by soldiers, work with civilian students?;

2) What is the minimum amount of degreening (removing the Army context) necessary to make it effective with civilians?

We proposed to degreen only a portion of the original Army curriculum enroute to determining the answers to these questions. By careful rescheduling and internal rebudgeting, and a no-cost extension to the contract, we found that we were able to address the entire curriculum with different levels of degreening. We devised degreening guidelines for adapting the original military lessons, based upon the systematic application of instructional design principles and our experience with JSEP. In brief, the guidelines are as follow:

1) Remove or adapt military context references when they have no civilian equivalents;

2) Convert all military spellings to civilians ones;

3) Remove acronyms where possible;

4) Convert military ranks and titles to generic, civilian terms;

5) Replace military jargon with more familiar expressions;

6) Change graphics and illustrations when they might confuse civilian students or when changes in text require corresponding changes in graphics; and

7) Where possible, lower the readability level of text with shorter sentences, familiar vocabulary, and by changing multi-syllable words to simpler forms.

In applying these guidelines during the degreening and adaptation process, we found it necessary to delete 25 lesson titles that involved military skills for which there was no civilian equivalent. In a similar manner, we have become aware of gaps in the curriculum where additional lesson titles would be appropriate; but as such curriculum expansion is well beyond the scope of the current contract, it will have to be addressed in some future effort.

The JSEP instructors have made us aware of desirable modifications to the SMS, that we also believe should be addressed in some near future activity. When the additional data are available, revisions will be made based on these developmental trails. Upon completion of revisions, JSEP will be ready for implementation in numerous settings based on market analyses that will be described later.

Recommended Future Directions from FSU

To implement JSEP in the widest number of applications will require the involvement of a marketing organization that has the capability to distribute, service, and update the program. It is our intention to make the necessary revisions in the program and to arrange distribution of JSEP through one or more marketing organizations.

Install JSEP in Industrial Settings. Because JSEP represents a substantial investment in equipment and courseware on the part of any industrial user, it will be necessary to select companies who have a sufficient population of eligible employees to make the investment pay off. To minimize the initial costs of implementation, and to accelerate the training process, we must develop an efficient and reliable method for establishing new occupational prescriptions.

Develop occupational prescriptions. During the recent civilian tryout of JSEP, prescriptions were developed by three methods: by using the literacy task analysis described earlier in this report; by using occupational comparisons using the NOICC Crosswalk between military and civilian occupations and subsequent analysis procedures, and , by using the Training Emphasis Scale developed by the U.S. Air Force. We intend to establish the latter procedure as a standard approach, since the other two are labor intensive and time consuming.

Operate systems at full capacity. Once the systems are operational and the new prescriptions have been developed, we want to see the systems operating at full capacity on a minimum of two shifts and preferably on three. We want to see the effects of using JSEP under two conditions: when employees are paid, and when they are not. We expect to see the greatest economic benefit for the paid employee and to identify the additional social benefit for the unpaid employee.

Analyze operations data. When these trials have been operating for sufficient time to establish baselines, we will analyze the data under those conditions. We are concerned with both the short and long-term performance results and will establish a method of follow-up to identify the outcomes of JSEP use. Additionally, we are equally concerned with the short-term reactive data if the employees don't like it, they will not continue to use it.

Revise the JSEP System. When all operations and test data have been analyzed and reviewed, we will establish revision priorities for each major user. These users will be represented by the White Plains Adult Continuing Education Center, Meridian Community College, and a selected industry.

Arrange JSEP Distribution Probably the most important decisions that can now be made will be the selection of methods of distribution. This is an issue we have studied for some time, particularly in light of previous research and development products developed with public funds. Since it is our objective to make JSEP permanently available to a wide variety of users, we want to insure that we have provided for effective distribution and service that do not rely on the federal budget. We can see no advantage to using temporarily available public funds to promote JSEP to a select few informed users, then have it disappear when administrators or administrations change.

After considering the prior experiences of our faculty and others who have worked on highly effective projects and who have seen them implemented only at tryout sites,

and subsequently stored on warehouse shelves or in government databases, we recognized that in the United States distribution is better handled by the private sector.

Products sold in the marketplace for a profit will remain in the marketplace, and competition will establish fair and reasonable prices. No public funds are required to sustain, service, and upgrade these products. To bring JSEP into the widest possible use, we intend to develop an effective business plan containing at least the elements described next.

Conduct analysis of markets. We have had preliminary discussions with distributors about the kinds of markets that JSEP will serve. These include large industrial organizations, community colleges, JTPA centers, JOBS programs, Job Corps Centers, and vocational schools. We do into now know the required configuration of JSEP for each of these markets. We must do a detailed market study to provide the basis upon which a marketing plan can be made.

Develop promotion and sales campaigns. One important criterion for selecting a vendor will be the extent to which they have addressed promotion and sales of the system. It may be that no single vendor can serve all potential markets. If we discover that is the case, we will identify multiple vendors, each servicing a particular market segment.

Develop JSEP support system. During the time that we have been operating JSEP, we have become aware of the necessity of providing support to the users. This support includes staff training, developing new occupational prescriptions, assisting in developing user-plans, and customer service. The support system consists of these elements:

1. Train trainers of customer site staff. The vendor must have a cadre of trainers who can go to a new site and train instructors and others in the operations and maintenance of the JSEP system. These trainers can be employed either full- or part-time.

2. Establish an "800" number for customer service. Once site staff are trained to operate JSEP, they must have the ability to call the vendor with problems that have come up or with questions that relate to system use. Thus, a "single point-of-contact" must be established so that users can call and have someone address their questions at the earliest possible time.

3. Establish quality system. It is essential that vendor-supplied JSEP be maintained at the highest levels of quality. New upgrades and revisions should be made available by the vendor at regular intervals so that all users have the same configuration at all times. We have not resolved the issue of whether to permit the inclusion of locally developed materials in the JSEP management system. That is a significant quality issue.

Expand JSEP. When JSEP becomes a viable commercial product, we will receive many requests to expand the program to meet new needs. Only when there are a number of users will there be any real confidence in deciding new products or services. To do that, we intend to accomplish the following. We will make a continuing study of customer needs and respond to those needs in priority order. When these new materials are developed, they will be distributed to subscribers according to a planned schedule.

Ford Aerospace

Current Equipment Requirements To Operate Civilian JSEP and Future Plans.

About ninety percent of the lessons for the civilian version of the Job Skills Education Program (JSEP) are computer-based, and all of the Student Management System (SMS) is computer-controlled. Therefore, JSEP requires computer equipment and the appropriate software to deliver the instructional program to the students. This will continue to be true no matter what product developments occur in hardware, software, and courseware.

The civilian version of JSEP was written using the ADAPT authoring language, a proprietary software product of Ford Aerospace Corporation. The ADAPT program operates using MircoTICCIT software, which in its current and future versions will run on many DOS-based machines.

When Meridian Community College purchased their JSEP system, certain hardware items required to run the program were proprietary products of Ford Aerospace Corporation and could be purchased only through Ford Aerospace. Most critical among these proprietary hardware items was the display board, called the 860A board.

Three new software products have been or are currently being developed by Ford Aerospace. The first eliminates the need for all Ford Aerospace proprietary hardware from the MicroTICCIT System. The second permits standard computers to run as student workstations when connected to a host. The third permits MicroTICCIT to be released as a software product to deliver courseware on various hosts or file servers.

The first stage of this development, eliminating all Ford proprietary hardware for the MicroTICCIT system, has already been accomplished and the software to run the systems is commercially available now. The Ford proprietary display board has been replaced by a commercially available VGA board. Therefore, hardware to run JSEP courseware can be purchased from a number of different vendors and assembled by the user, if the user so desires. Alternatively, Ford Aerospace will assemble the systems for the user or supply a turnkey solution by purchasing the equipment and assembling it for the user.

The second stage of the development process, permitting standard computers such as the IBM PS/2 Model 50 and most other VGA based AT systems to serve as student workstations, is in the beta phase of development. A commercial release of this software product will be no later than October 1990 and may be as early as March 1990. With this release, the user will be able to purchase such equipment (from Ford Aerospace or another vendor), add two boards to the workstation, and use the workstation attached in a local area network to a host system to deliver JSEP. The two boards that must be added to the system are a commercially available local area network board, which permits the student workstation to communicate with the host, and a commercially available light pen board and light pen, which permit the student to interact with the courseware using touch rather than keyboard interactions. (A touch panel can be substituted for the light pen and its accompanying board, but the cost of the touch panel is more than four times more expensive than the light pen.) A

laminated plastic keyboard template that overlays the standard keyboard will be necessary to indicate the TICCIT keys for students to interact with the system unless the standard student TICCIT keyboard is purchased from Ford Aerospace and used with the workstation.

The final stage of development, permitting MicroTICCIT to be released as a software product to deliver JSEP courseware on various hosts or file servers, will be released in its beta phase in July 1990. Commercial release is planned for October 1990. As a minimum, JSEP user sites may purchase software on a tape, documentation, and keyboard templates from Ford Aerospace. Alternatively, they may have Ford Aerospace purchase and/or assemble some or all of the hardware for their JSEP system. In any case, an efficient and cost-effective JSEP system will require either a host computer or a file server equipped with a large hard disk drive and a local area network. With that environment, all of the courseware can reside on the single hard disk drive and the instructor can have one central point for collecting student records. The workstations within this system might be equipment that is already available at the site, and it can remain multipurpose equipment, used for such applications as word processing or other training.

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